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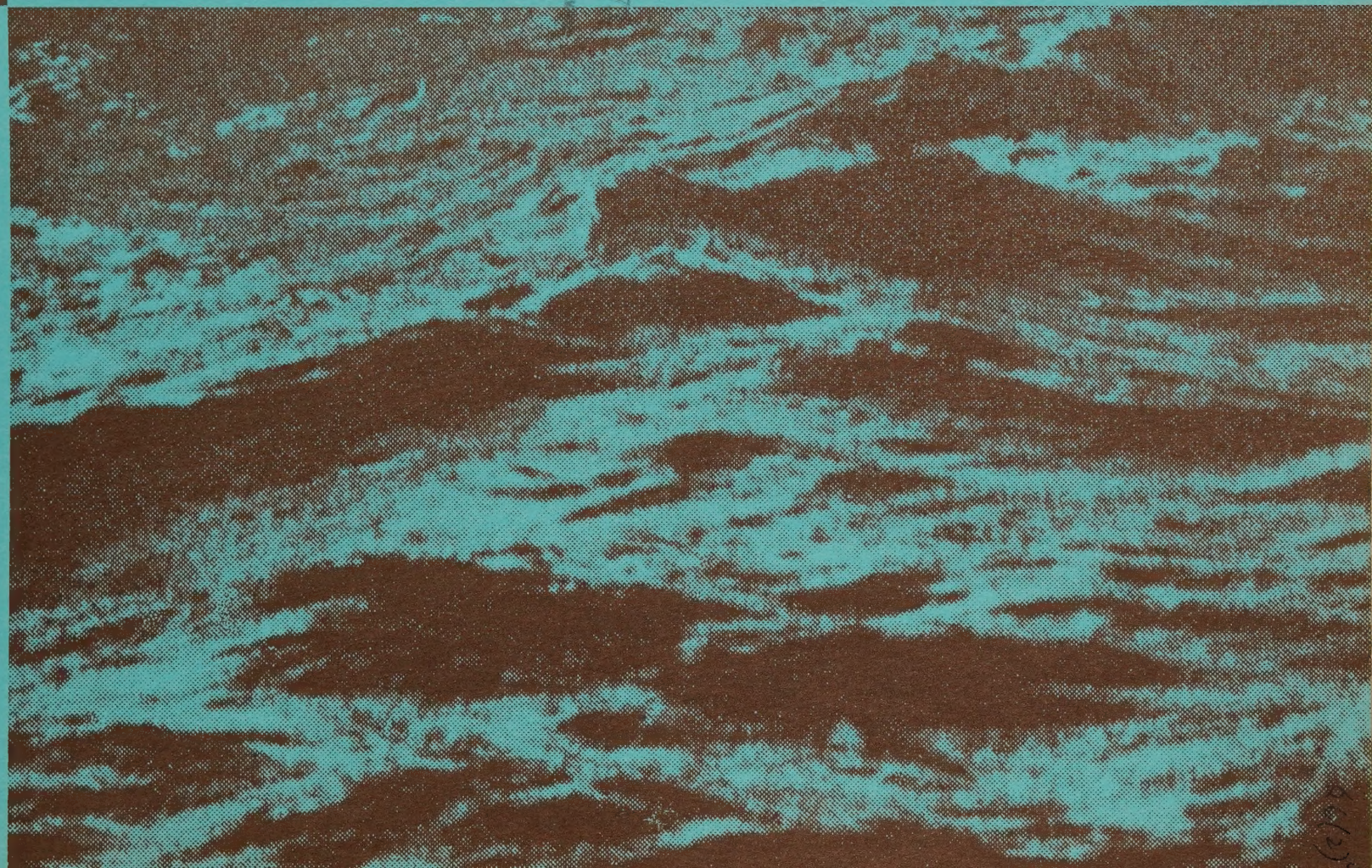

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FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Commercial Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402 - Subscription price: $6.50 per year.

0.116 (9.3) APPARATUS FOR AUTOMATED GEL PERMEATION CLEANUP FOR PESTICIDE RESIDUE ANALYSIS. APPLICATIONS TO FISH LIPIDS

Tindle, Roger C., and David L. Stalling (Fish-Pesticide Research Laboratory, Columbia, MO 65201)
Analytical Chemistry 44, No. 11, 1768-1773 (Sept. 1972)

In the analysis of sample extracts for pesticide residues, separation of lipids is often time consuming. Automating analyses for pesticides would improve precision, decrease sample losses, and save labor. The basic analytical technique, however, must be amenable to automation.

Previously, the authors reported a gel permeation cleanup procedure for separation of pesticides from lipids in sample extracts (J. Assn. Offic. Anal. Chem. 55, 32-38 (1972)). Because of the long elution time required by the procedure the authors believe that it is not entirely practical for manual operation. The procedure lends itself to automation, in the authors' view.

In this article, the authors describe an automated gel permeation chromatography system which consists of a solvent source and pump, a manual loading valve, a remotely controllable sample introduction system, a chromatography column, and a remotely controllable sample collection system. The system is capable of either manual or automatic control of sample introduction and sample collection. An external digital controller allows automatic unattended operation of the system for periods up to 24 hr.

The procedure was found to be extremely reproducible provided limits of lipid concentration and flow rates of the original (manual) procedure are observed. Cross contamination of samples was negligible. Simulated sample extracts were

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0.117 (6.113) DEVELOPMENT OF A LABORATORY-SCALE RECIPROCATING PLATE EXTRACTION COLUMN

Lo, Teh C., and Andrew E. Karr (Hoffmann-La Roche Inc., Nutley, NJ 07110)
Industrial & Engineering Chemistry, Process Design and Development 11, No. 4, 495-501 (Oct. 1972)

Data are given on a laboratory-scale, open-type perforated reciprocating-plate extraction column. The column consists of a series of open-type perforated plates mounted on a central shaft. The shaft (and plates) is reciprocated by a simple drive mechanism at the top of the column. The column consists of 1-in. (internal diameter) Pyrex pipe; plates are punched out of 1/16-in. Teflon sheet; they have a free area of about 50%. The mechanism is driven by a 1/70-hp. motor.

A methyl isobutyl ketone-acetic acid-water system was tested; the solute was first extracted from the aqueous solution by the methyl isobutyl ketone phase, and in the following run, the solute was extracted from the organic phase by the aqueous phase. The plates were spaced 1-in. apart. A constant amplitude of 1/2-in. was used. Variables studied were reciprocating speed [strokes per minutes (SPM)] and throughput.

Using the methyl isobutyl ketone-acetic acid-water system, a minimum height of an equivalent theoretical stage (HETS) of 2.8-in. volumetric efficiencies of up to 532 hr^{-1} were achieved in the 1-in. diameter column. The column had the lowest HETS and the highest volumetric efficiency than those reported of other columns (mechanically aided).

At a given throughput, the HETS did not pass through a minimum; rather, it decreased as the speed of reciprocation increased until flooding occurred. This

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0.118 (7.0) MERCURY DETECTION BY MEANS OF THIN GOLD FILMS

McNerney, John J., Peter R. Buseck (Depts. of Chemistry and Geology, Arizona State University, Tempe, AR 85281), and Roland C. Hanson
Science 178, No. 4061, 611-612 (Nov. 10, 1972)

Most semiportable instruments for detecting low concentrations of mercury (Hg) have relied on the atomic absorption technique. A serious limitation of these instruments is the presence of interfering substances such as moisture, ozone, sulfur dioxide, and a variety of organic compounds and fine particulates.

The authors have developed an extremely sensitive and portable Hg detector based on the phenomenon that a thin layer gold (Au) film undergoes a significant increase in resistance upon adsorption of Hg vapor. The resistance increase is linear in nanogram concentrations of mercury.

Gold films were prepared on ceramic or glass substrates in a conventional high-vacuum system with the use of a chromium underlayer and no substrate heating. After preparation, the films were annealed in the atmosphere at 150° C. The film resistances ranged from 300 to 1,500 ohms.

As shown in figure 1, two films of equal resistance are used, one as a sensor and the other as a reference. They are contained in a plexiglass chamber which guides a constant flow of gas over the films. The films are connected into opposite arms of a simple d-c bridge circuit and balanced. Carrier gas, normally air, is filtered through activated charcoal before pickup of sample material and passed over the gold films. Mercury from solid samples may be liberated in furnace 1, after treatment. If the sample is already a vapor it may be injected at point 2.

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0.32 (0.7) INTERACTIONS OF SOME WOOD SMOKE COMPONENTS WITH ϵ-AMINO GROUPS IN PROTEINS

Chen, Lan-Bo, and Phillip Issenberg (Dept. of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139)
Journal of Agricultural and Food Chemistry 20, No. 6, 1113-1115 (Nov.-Dec. 1972)

In the United States, commercial smoking of foods is primarily for flavor and color, but some extension of shelf life of the food may occur. The preservative effect of wood smoking of foods results from partial dehydration of the surface of the food and from deposition of smoke components with antimicrobial and antioxidant activity. Because of our concern about the nutritional value of processed foods and about chemicals added to foods, we should know the identities and amounts of smoke components consumed as well as the nature of the reaction products formed when foods are exposed to smoke. Many of the components of wood smoke have been identified but there is limited information on the chemical reactions in smoked foods or on the reaction products. The present study was concerned with the extent to which some specific wood smoke components react with ϵ-amino groups of lysine in protein and to determine the significance of these components in causing the loss of available lysine during the smoking process. The authors wanted to find out whether the interaction of proteins with coniferaldehyde and sinapaldehyde (major phenolic components of wood smoke condensates) could account for the inability to recover these compounds from smoked food products.

Uncured lean beef sirloin strips were exposed to wood smoke for 10 hr. The smoked strips had lost 44% of the available lysine initially present. Heating the

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0.117 (6.113)

characteristic, the authors state, is highly desirable because it provides a straightforward means of selecting optimum speed of reciprocation.

The column was suitable for processing mixtures that tend to emulsify and for processing liquids containing suspended solids. The extraction column is simple in construction and easy to operate and maintain. Furthermore, it is highly versatile--reciprocating speed, amplitude, and plate spacing can be readily changed to provide optimum process performance.

[7 figures, 4 tables, 28 references]

FTP

0.117 A MICROMETHOD TO GENERATE AND COLLECT ODOR CONSTITUENTS (4.11) FROM HEATED COOKING OILS

Selke, E., W. K. Rohwedder, and H. J. Dutton (Northern Regional Research Laboratory, U.S. Department of Agriculture, Peoria, IL 61604)
Journal of the American Oil Chemists' Society 49, No. 11, 636-640 (Nov. 1972)

A stainless-steel reactor, about one-milliionth of the volume of a home kitchen was built to generate odors from cooking oils heated to deep fat frying temperatures. The volatiles can be collected from 1-5 ml. of heated oils (193° C.) directly on a gas chromatographic column, cooled to -60° C., and then separated by temperature programming up to 250° C. The design has provisions for three independent means of effluent monitoring--flame ionization detection, odor analyses, and mass spectrometry.

[2 figures, 2 tables, 15 references] FTP

0.116 (9.3)

prepared in cyclohexane to determine recoveries and precision. Each 5 ml. sample contained 250 mg. of corn oil in addition to mixtures of pesticides. Concentrations of lipid and pesticide simulated those frequently encountered in actual extracts of whole ground fish where 1 ml. of sample represents 1 g. of fish. Aliquots of a prepared solution were independently processed in the automated system. The small values for the standard errors (0.02 to 0.06) and coefficients of variation (2.2 to 3.6%) indicate that the system gave reproducible results.

Any technique that uses only one solvent throughout sample addition and elution could be adapted to this system without significant modification. A flow diagram and an electrical schematic of the system are included.

[2 figures, 3 tables, 12 references]

SW

0.3 FISHERMAN'S SOAP

Hoffman, Paul, and John D. Hodge, Jr. (pat.)
U.S. Patent 3,650,968 (Mar. 21, 1972)
Chemical Abstracts 77, No. 4, 22015a (July 24, 1972)

0.32 (0.7)

sirloin strips in air at 65° C. for 10 hr. resulted in a 15% loss in available lysine.

Homogenated samples of the lean beef were treated with acidic, phenolic, or neutral fractions of smoke condensate; they lost 14%, 38%, and 45% of their available lysine, respectively.

A model system was prepared using a soluble protein, bovine serum albumin. It was treated with pure wood smoke components and the degree of interaction was determined spectrophotometrically by measuring the extent to which the protein reacted with dinitrobenzyl sulfonate. The selected chemicals were sinapaldehyde, coniferaldehyde, formaldehyde, glyoxal, pyruvaldehyde, furfural, and furfuryl alcohol. A reduction in available ϵ-amino groups occurred when bovine serum albumin was treated with coniferaldehyde and sinapaldehyde; the reduction was comparable to that obtained for some previously known active aldehydes (formaldehyde, glyoxal, pyruvaldehyde, and furfural). Bovine serum albumin treated with phenol, cyclotene, eugenol, or syringol showed no significantly detectable interaction.

When casein was treated with aldehydes and phenolic aldehydes, a variety of colors, ranging from yellow to red, was produced.

[1 figure, 4 tables, 25 references]

FTP

0.118 (7.0)

The vapor from either source is then surged into the flow path by the carrier gas. Before the gas enters the film chamber, it is scrubbed of moisture and H_2S in a filter train containing magnesium perchlorate and ascarite. In addition, air entering the reference chamber is first scrubbed free of Hg in a chamber containing palladium chloride.

The film produced a linear change in resistance for amounts of Hg ranging from 5×10^{-11} to 1×10^{-7}. Larger amounts produced nonlinear responses because of the saturation of the gold film surface. By heating to 150° C. for 10 min. the gold film can be cleaned of adsorbed Hg.

[1 figure, 1 table, 11 references]

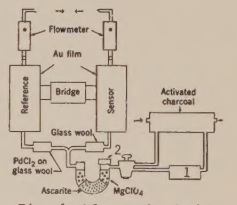

Fig. 1 Flow path of the instrument.

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0.32 (0.7) PROCESSING DAMAGE TO PROTEIN FOOD. A REVIEW

Bender, A. E. (Queen Elizabeth College, London University, London, England)
Journal of Food Technology 7, No. 3, 239-250 (Sept. 1972)

A consideration of the effects of processing treatment on the nutritive value of protein foods must be conditioned by three principles. First, a food must comprise a reasonable proportion of the diet for any change in its nutritive value to be of any consequence. (For example, certain processes cause considerable destruction to the protein of breakfast cereals, but the amount of such foods normally eaten contribute so little protein that the dietary effect of the damage is insignificant.) Second, the inadequacies of the biological assay methods of determining nutritive value may lead to inaccurate conclusions. (For example, the amino acids methionine plus cystine are limiting in fish meals, so if the amount of available lysine is reduced the biological assay methods will show no change until the damage is severe enough to make lysine limiting.) Third, it appears that many diets are limited by the sulfur amino acids; therefore, the Maillard reaction, involving lysine, may be of interest only when it is limiting in the diet as a whole.

Although foods undergo many processes (heating, drying, irradiation, freezing, chemical treatment, and storage), the heating process has the most important effect on protein quality. However, heating can be both beneficial and detrimental. The nutritive value of most legumes are improved by heating (partly due to destruction of trypsin inhibitors and toxic materials, and partly due to improvement

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0.35 LOCATION OF LIPID-SOLUBLE SELENIUM IN MARINE FISH TO THE LIPOPROTEINS

Lunde, Gulbrand (Central Institute for Industrial Research, Forskningsveien 1, Blindern, Oslo 3, Norway)
Journal of the Science of Food and Agriculture 23, No. 8, 987-994 (Aug. 1972)

Marine oils contain from 0.1 to 2.0 p.p.m. of selenium, and the selenium is present as a lipid-soluble organic selenium compound of a polar character. The purpose of the present study was to determine whether this compound is bound to the lipid phase in the high molecular weight fraction (a part of the lipoprotein complex) of marine oils.

Apparently, the lipid-soluble selenium compound is enriched in the high molecular weight (m.w. $\geq$ 5,000) extracts of the fish. The selenium compound is enriched in the oil extracted from fish by a mixture of nonpolar and polar organic solvents (hexane-isopropanol), but the selenium is also present in oil samples extracted with nonpolar solvents (hexane) only or by treatment with water at 60° C. Stored raw fish gradually deteriorates and the selenium content in the oil produced by boiling the raw fish material increases with time.

The results indicate that part of the lipid-soluble selenium is bound as a lipoprotein, but some of it is either bound relatively weakly or exists free in the lipid phase. The selenium content of marine oils prepared from fish of various storage ages is shown in the table that follows.

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0.35 EFFECT OF INORGANIC SALTS ON THE STRENGTH OF MUSCLE FIBERS

Nakamura, Ryo (Laboratory of Food Science and Technology, Animal Products, Faculty of Agriculture, Nagoya University, Nagoya, Japan)
Journal of Agricultural and Food Chemistry 20, No. 6, 1167-1169 (Nov.-Dec. 1972)

In earlier work, the author found that the tensile strength of muscle fibers decreased during postmortem aging and that it decreased in the presence of small amounts of Ca ions. These results suggested that the cause of the changes in the tensile strength of the muscle fibers might be the Ca ions released from muscles during postmortem aging. In the present study, the effect of inorganic salts on the strength of muscle fibers was examined. Tensile strength was measured about the muscle fibers prepared from the chicken pectoralis major muscles after incubation with various kinds of salt solutions. The various salts considered were NaCl, KCl, KI, KNO_3, CH_3COOK, K_2SO_4 , K-tartrate, K_2HPO_4, KH_2PO_4, Na-tripolyphosphate, Na-hexametaphosphate, LiCl, $CaCl_2$, $MgCl_2$, and $BaCl_2$.

Between pH 5.0 and 8.0 the tensile strength of the muscle fibers changed little. The monovalent cations and most of the anions had a relatively small effect. The divalent cations and phosphates decreased greatly the tensile strength of muscle fibers. A similar effect of the divalent cations and phosphates was found in an experiment involving the rehydration of the lyophilized muscles in these salt solutions.
[1 figure, 5 tables, 7 references] FTP

0.35 CHARACTERIZATION OF THE COPPER-BINDING OF PHOSPHATIDYL ETHANOLAMINE EMULSION IN ITS RAPID AUTOXIDATION

Morita, Makio, and Masao Fujimaki (Dept. of Agricultural Chemistry, Faculty of Agriculture, University of Tokyo, Tokyo, Japan)
Agricultural and Biological Chemistry 36, No. 10, 1751-1754 (Oct. 1972)

In earlier work [Agr. Biol. Chem. 36, 1163 (1972)], the authors found that copper catalyzes the oxygen uptake of phospholipids, especially phosphatidyl ethanolamine (measured by Warburg's manometry). In the present study, it was found that EDTA (ethylenediaminetetraacetic acid) added to a phosphatidyl ethanolamine emulsion inactivated copper stoichiometrically in molar ratio of 1:1. However, monoethanolamine, α-glycerophosphoric acid, O-phosphorylethanolamine, and glyceryl phosphoryl ethanolamine did not. Iminodiacetic acid depressed oxygen uptake of phosphatidyl ethanolamine. The authors conclude that the reason why copper tends to accumulate in the phospholipid fraction of certain systems (food or biological tissue) and to promote their oxidation may be the chelatelike high affinity of the phosphatidyl ethanolamine interface.
[2 figures, 1 table, 8 references] FTP

0.12 (0.8) MEMBRANE SEPARATION PROCESSES

Lacey, Robert E. (Southern Research Institute, 2000 Ninth Ave. South, Birmingham, AL 35205)
Chemical Engineering 79, No. 19, 56-74 (Sept. 4, 1972)

The author describes electrodialysis, reverse osmosis, and ultrafiltration techniques of membrane separation processes. One section deals with the various types of membranes used and another section describes the various processes.

Separation processes can be used for demineralization (for example, removal of minerals from sugar solutions and from whey), concentration of salts (production of concentrated brine from sea water), and separation of small solid particles from solutes (treatment of industrial wastes, recovery of protein from soy whey). Future applications of ultrafiltration might include the concentrating and desalting of enzymes, concentrating egg albumin, recovering valuable protein products from soybean whey and packinghouse blood, dewatering biological sewage sludges, or treating wastes from metal finishing operations. Reverse osmosis might be used to produce fruit juice concentrates with improved flavor, recovery of metals in the metal-plating industry, or removing and recovering materials from the dilute wastes of the pulp and paper industry. Electrodialysis might be used to preconcentrate solutions of electrolytes prior to spray or drum drying, to separate certain ions in dilute waste streams, or to de-ash organic products such as glycerol or sorbitol.

Copies of this report are available from the publisher, Chemical Engineering, International Data Processing Center, 121 South Gertrude Ave., Paramus, NJ 07652. Price $2.00, order number 162.
[27 figures, 4 tables, 68 references] FTP

0.6 EXPANDED PROTEIN PRODUCTS

Ralston Purina Co. (A. A. Schulz, E. V. Oborsh, and A. V. Brown) (U.S.A.) (pat.)
British Patent 1,271,173
BFMIRA Abstracts 25, No. 7, Abstract No. 2328, 470 (July 1972)

An expanded protein product, in the form of a gel, having texture and moisture stability is reported. Reprinted

0.32 (0.7)

in the digestibility and availability of the sulfur amino acids). Heat damage to proteins can involve destruction of amino acids by oxidation, loss of palatability, modification of amino-acid linkages resulting in delayed release during digestion, and formation of linkages that are not hydrolyzed during digestion.

The author reviews some of the literature on the processing damage to the protein of foods. Apparently, the variations between experimental conditions used by different research workers can account for the differences in their results on the protein quality of foodstuffs. Similarly, variations in processing procedures in commercial plants can account for the variations in protein quality of foodstuffs. Although conditions for producing foodstuff with the minimum of damage to protein quality have been established, these conditions may be difficult to control in commercial manufacturing processes.
[76 references] FTP

0.35

Fish sample	Storage time	Selenium content	Storage time	Selenium content	Storage time	Selenium content
	days	p.p.m.	days	p.p.m.	days	p.p.m.
Capelin	2	0.05	5	0.08	7	0.11
Herring	3	0.11	6	0.17	8	0.21
Mackerel	2	0.09	5	0.22	7	0.28

[3 figures, 3 tables, 4 references] FTP

0.321 STRUCTURE OF A CALCIUM-BINDING PROTEIN FROM CARP MUSCLE

Kretsinger, Robert H., Clive E. Nockolds, Carole J. Coffee, and Ralph A. Bradshaw
(Dep. Biol., Univ. Virginia, Charlottesville, Va.)
Chemical Abstracts 76, No. 23, 137197h (June 5, 1972)

0.36 (9.1) RECENT PROGRESS IN RESEARCH ON THE UROPHYSIS

Lederis, K. (Fac. Med., Univ. Calgary, Calgary, Alberta, Canada)
Chemical Abstracts 77, No. 9, 56830c (Aug. 28, 1972)

0.6 (0.7) SATURATED SALT SOLUTION PREPARED BY EVAPORATING SEA WATER

Abeille, Elzear
French Patent 2,082,097 (Jan. 14, 1972)
Chemical Abstracts 77, No. 13, 86773d (Sept. 25, 1972)

0.4 METABOLIC INTERACTIONS AMONG ENVIRONMENTAL CHEMICALS AND DRUGS

Conney, A. H. (Dept. of Biochemistry and Drug Metabolism, Hoffmann-La Roche Inc., Nutley, NJ 07110), and J. J. Burns
Science 178, No. 4061, 576-586 (Nov. 10, 1972)

Metabolic interactions occur among ingested drugs, insecticides, food additives, carcinogenic hydrocarbons, and a variety of environmental chemicals. These effects are due to the versatile nature of the liver microsomal enzymes. The microsomal enzymes can metabolize chemicals with diverse structures and biological activities; furthermore, these enzymes can be stimulated or inhibited by other chemicals administered simultaneously. The authors gave examples of interaction.

In attempts to increase the incidence of cancer in rats, they were fed two carcinogens simultaneously. Results showed that the activity of the liver carcinogen 3'-methyl-4-dimethylaminoazobenzene was abolished when this aminoazo dye was fed simultaneously with the carcinogenic, polycyclic hydrocarbon, 3-methylcholanthrene. The inhibition of carcinogen activity was found to be caused by the 3-methylcholanthrene induced synthesis of liver microsomal enzymes that metabolized aminoazo dyes by N-demethylation and azo link reduction to noncarcinogenic products.

Patients who control diabetes with tolbutamide may be exposed to serious hypoglycemia if they also take drugs such as phenylbutazone, sulfaphenazole, phenyramidol, bishydroxycoumarin, and chloramphenicol. These drugs inhibit the metabolic inactivation of tolbutamide in man.

Phenobarbital decreases the action of other drugs by increasing the rate at which they are metabolized to inactive substances. Several hundred other drugs,

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0.5 (9.15)(9.16) INADEQUACY OF AQUARIUM ANTIBACTERIAL FORMULATIONS FOR THE INHIBITION OF POTENTIAL PATHOGENS OF FRESHWATER FISH

Trust, T. J. (Dept. of Bacteriology and Biochemistry, University of Victoria, Victoria, British Columbia, Canada)
Journal of the Fisheries Research Board of Canada 29, No. 10, 1425-1430 (Oct. 1972)

Many species of tropical fishes are used not only in home aquaria but in certain areas of biological research. These fish are susceptible to bacterial infections, the most frequent of which are fin and tail rot, furunculosis, gill infections, piscine mycobacteriosis, columnaris disease, and infectious hemmorhagic septicemia. In this study, the effectiveness of 14 commercial products against a number of the species of bacteria that are pathogenic for fishes was examined. The antibacterial activity of the formulations was determined by standard bacteriological assay methods and by bioassay. The test organisms were Aeromonas liquefaciens, A. salmonicida, Chrondrococcus columnaris, Mycobacterium marinum, Pseudomonas putida, P. aeruginosa, Staphylococcus aureus, and Bacillus subtilis. The bacteriostatic activity of the products was determined by serial dilution using the method of F. Kavanagh [In Analytical Microbiology, F. Kavanagh (ed.), Academic Press Inc., New York, N.Y. (1963), pp. 125-140]. The bactericidal assays were made by the Phenol Coefficient-Official Final Action Method of the Association of Official Analytical Chemists [Official Methods of Analysis of the AOAC, 11th ed. (1970), pp. 63-67, 754]. The bactericidal activity of the products in aquaria holding fish (goldfish and guppies) was tested using one, two, and four times the concentration recommended by the manufacturers. The various products

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0.6 FOOD USES OF TRITICALE

Lorenz, K. (Dept. of Food Science and Nutrition, Colorado State University, Fort Collins, CO 80521)
Food Technology 26, No. 11, 66, 68, 70, 72, 74 (Nov. 1972)

Triticale is a cereal grain produced by cross-breeding wheat and rye. It is a good potential source of protein and lysine. This article deals with the composition, characteristics, and potential uses of triticale, and gives data on its use in bread, rolls, and noodles. Some characteristics of the 1971 crop of triticale and wheat are shown in the table that follows.

Item	Grain	Flour		
	Protein [1]	Protein [1]	Ash [1]	Yield
	%	%	%	%
Spring triticale	15.7	12.7	0.54	61.9
Spring wheat	14.3	14.0	0.46	69.1
Winter triticale	13.1	11.6	0.49	56.4
Winter wheat	12.5	11.7	0.44	66.8

[1] On a 14% moisture basis.

The author states that some triticale lines have higher protein content, better amino-acid balance, and higher protein value than do some wheat varieties. Certain varieties of triticales can be used for preparing American-type white bread; however, changes in the bread dough mixing procedures must be used. The high level of alpha-amylase activity in triticale has an adverse effect on product quality; decreasing this activity results in improvement of baked products. White rye breads, hard rolls, and noodles can be prepared from triticale.
[3 figures, 5 tables, 27 references]

FTP

0.7 (6.54) MEETING OF THE PAG AD HOC WORKING GROUP ON SINGLE CELL PROTEIN

Anonymous
PAG Bull. [FAO/WHO/UNICEF, United Nations, New York, N.Y.], 2, No. 1, 2-5 (1971)
BFMIRA Abstracts 25, No. 5, Abstract No. 1678, 340 (May 1972)

An account of a meeting held during June 1971 at the Institute of Nutrition in Moscow. The problems presented by the adverse effects of nucleic acids ingested in large quantity were briefly discussed together with the nutritional value and potential food uses of single cell protein production is given. L.P.

Reprinted

0.7 (6.54) SINGLE CELL PROTEIN IN CLINICAL TESTING

Abrahamsson, L., et al.
Nutr. Metabol. 13, Nos. 3-4, 186-199 (1971)
BFMIRA Abstracts 25, No. 5, Abstract No. 1679, 341 (May 1972)

A preparation derived from an unnamed organism grown on a hydrocarbon fraction was given daily to 20 healthy adults as part of a normal diet during six weeks. Dietary studies showed that the distinctive flavour was difficult to accept when the product was eaten daily. Clinical and biochemical investigations showed few side-effects though there was a significant but transient rise in the serum uric acid level in the first 2 weeks. L.P.

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contained a variety of chemicals including sulfanilamide: sulfamethazine; 6,9 diamino-2-ethoxyacridine lactate; 3,6-diamino-10-methyl acridinium chloride; 9 aminoacridine hydrochloride; formaldehyde; methylene blue; sulfathiazole; quinine sulfate; neutral acriflavine; malachite green; sodium sulfathiazole; $KMnO_4$; Ag_2O; and other ingredients not specified.

When the products were used at the level recommended by the manufacturers, they failed to inhibit the growth of the test bacterial species (potential pathogens of tropical fishes) and failed to reduce significantly the numbers of bacteria in water containing fish. The concentrations of the commercial products that were bacteriostatic, bactericidal, or sporicidal were considerably higher than the concentrations recommended by the manufacturers. Two of the products, when used in concentrations higher than that recommended, were found to be inimical to fish. Because certain aquarium fish are used in research work, scientific workers should be aware of the limitations of commercial formulations for use in the therapy and prophylaxis of bacterial infections of these fish.
[3 tables, 18 references]

FTP

0.5 RELATIONS OF AUTOTROPHIC AMMONIUM-OXIDIZING BACTERIA TO MARINE SALTS

Finstein, M. S., and Margaret R. Blitzky (Dep. Environ. Sci., Rutgers State Univ., New Brunswick, N.J.)
Chemical Abstracts 76, No. 23, 136254n (June 5, 1972)

0.4

insecticides, carcinogens, steroid hormones, and other chemicals are now known to stimulate drug metabolism in animals, and many of these compounds have been shown to stimulate the metabolism of drugs and normal body constituents in man.

Alcoholics metabolize tolbutamide more rapidly than nonalcoholics. This fact must be taken into consideration in use of the drug for treatment of diabetes. Ethanol stimulates the metabolism of the drug. Alcoholics also metabolize pentobarbital, meprobamate, diphenylhydantoin, warfarin, and antipyrine more rapidly than nonalcoholics. This increased metabolism helps to explain the higher tolerance of alcoholics when sober to barbiturates and other sedatives. A single large dose of ethanol, however, inhibits drug metabolism, and this effect--in addition to the central depressant action of the alcohol--explains the enhanced sensitivity of inebriated individuals to barbiturates and other sedatives.

Halogenated hydrocarbon insecticides also stimulate drug metabolism. These compounds include chlordane, DDT, methoxychlor, aldrin, endrin, dieldrin, heptachlor, and benzene hexachloride. The duration of sleep produced by a dose of pentobarbital in rats given DDT was decreased 25% and 50% with respect to DDT concentrations in fat of 9.4 and 15.5 μg./g. Insects can detoxify pesticides by microsomal hydroxylation. This activity explains differences in resistance of various strains of insects. Steroid metabolism can also be altered by phenobarbital, DDT, and chlordane. Treatment of immature rats with these compounds several days before injection of testosterone inhibits the growth-promoting effect of these androgens on the seminal vesicles. In addition, halogenated hydrocarbon insecticides were found to have estrogenic acitivity in the rat.

The importance of these findings emphasizes the need for a concerted effort by scientists in many disciplines to determine the importance to public health of the interactions that occur among the multitude of environmental chemicals to which we are all exposed. [6 figures, 6 tables, 186 references]

SW

0.9 BACTERIAL REDUCTION OF ARSENATE IN SEA WATER

Johnson, David L. (Graduate School of Oceanography, University of Rhode Island, Kingston, RI 02881)
Nature 240, No. 5375, 44-45 (Nov. 3, 1972)

Arsenic occurs in the ocean primarily as arsenite and arsenate, but they are not in equilibrium. In experiments conducted elsewhere by the author, when sodium arsenite was added to surface Sargasso Sea water, the arsenite should have been completely oxidized to arsenate in a matter of weeks or months, but this reaction did not occur.

Because bacterial reduction had been suggested as a cause of the values of ratios of certain elements in sea water to differ from their equilibrium values, a similar study was conducted for the reduction of arsenate.

Bacterial cultures were obtained from phytoplankton filtered from Narragansett Bay, mixed with about 100 ml. of sterile Sargasso Sea water, and allowed to stand for a few days. The resulting supernatant liquid was inoculated onto sterile media samples composed of Guillard's medium "f" (omitting silicate) diluted with Sargasso Sea water and enriched with sucrose. The medium was aerated, and sodium arsenite and bacteria inoculum in log phase of growth were added.

After 8 hr., arsenate began to be replaced with arsenite, although total arsenic remained constant and no arsenic accumulation by bacteria was evident. After 15 hr., almost all the arsenate had been reduced to arsenite.

Since these experiments have shown that bacterial arsenate reduction has been demonstrated in sea water, the author suggests that such a process may occur in the open ocean and would help explain the arsenite concentrations observed in sea water. [1 figure, 12 references]

Lee Thorson

0.6 MEAT, FISH AND POULTRY TREATING (FLAVOURING) PROCESS

Armour and Co. (U.S.A.) (pat.)
British Patent 1,266,162
BFMIRA Abstracts 25, No. 5, Abstract No. 1880, 381 (May 1972)

The object of this invention is a process for treating raw meat (including fish and poultry) with materials to impart flavour to the meat upon cooking. A water-soluble flavouring material is admixed with an edible fat which is the continuous phase. Chilling the meat congeals the fat, holding the water-soluble materials away from the natural juices. Upon cooking the fat melts and releases the flavouring materials to the meat juices.

Reprinted

0.6 MICROBIOLOGICAL PRODUCTION OF PROTEIN FROM OXYGENATED HYDROCARBONS

ESSO Research and Engineering Co. (U.S.A.) (pat.)
British Patent 1,270,027
BFMIRA Abstracts 25, No. 7, Abstract No. 2309, 467 (July 1972)

This invention relates to an aerobic fermentation process for the preparation of a high protein content product. Gram negative bacteria are employed as the microorganisms and alcohol as the oxygenated hydrocarbon acting as the primary carbon source. The product is detoxified after fermentation by acidifying in a pH range of 1.0 to 4.5 and then subjecting it to a temperature in the range 60-141° C.

Reprinted

1.0112 (1.34) FORECAST OF THE 1972 PINK SALMON RUNS, SOUTHEASTERN ALASKA

Durley, Kenneth E., and Melvin C. Seibel (Alaska Dept. of Fish and Game, Division of Commercial Fisheries, Juneau, Alaska)
Information Leaflet No. 158, State of Alaska, Dept. of Fish and Game, Juneau, AK 99801 (July 1972), 39 pp.

Annual pink salmon forecasts are important to the fishing industry; they are useful for operational planning and regulatory decision making. This forecast is based on the relation between preemergent fry abundance and subsequent adult return. Mature salmon returning to inshore waters are normally referred to as the "run" or "return." The total run consists of harvest plus escapement. The term escapement refers to those fish which have survived natural and harvest mortalities, reached the spawning grounds and have become part of the spawning population.

To obtain estimates of total escapement each year would be difficult and the cost prohibitive. Instead, an index of escapement is obtained by estimating escapements to a number of streams which receive a large and relatively constant proportion of the total area escapement.

Southeastern Alaska, for the purpose of the forecast, is divided into northern southeastern, and southern southeastern and results in two separate forecasts.

The expected 1972 returns were determined by weighting the percent of the total 1970 escapement returning to each district by the subsequent alevin indices and then applying these percentages to the total run prediction. The 1972 forecast estimates a return of 13.7 million pink salmon to southern southeastern and a return of 12.9 million to northern southeastern for a total return of 26.6

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2.00 THE CONNECTIVE TISSUES OF FISH. VI. MECHANICAL STUDIES ON ISOLATED MYOCOMMATA

Love, R. M., J. Lavéty (Torry Research Station, 135 Abbey Road, Aberdeen, Scotland), and N. G. Garcia
Journal of Food Technology 7, No. 3, 291-301 (Sept. 1972)

The previous reports in this series dealt with the various factors that cause failure in the connective tissue which holds the myotomes of a fillet together. (The myotomes are the muscle segments of the fish. The connective tissue sheet is the myocomma.) Earlier work by R. M. Love, J. Lavéty, and P. J. Steel, [J. Fd Technol. 4, 39 (1969)] showed that tubular processes project from each myocomma and extend between the adjacent muscle cells. When these processes break at the muscle cell-myocomma junction, the phenomenon known as gaping occurs. In the present study, the breaking strengths of myocomma tissue under different conditions were determined.

The myocommata were carefully removed from the fish fillets. A 1-cm. strip was cut from each myocommata, and the ends of each strip were tied with linen surgical suture thread. One end was fastened to a hook in the base of a buffer solution chamber and the other end was attached to a movable beam. The buffer chamber was mounted in a bath of ice water. The beam pivoted at its center. One end of the beam was attached to the myocommata specimen and the other end was attached to a transducer which measured the tension. This equipment was used to measure the breaking-strengths of the strips of myocommata at different pH values and at different temperatures. When the effect of temperature was examined the

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2.00 THE CONNECTIVE TISSUES OF FISH. V. GAPING IN COD OF DIFFERENT SIZES AS INFLUENCED BY A SEASONAL VARIATION IN THE ULTIMATE pH

Love, R. M., M. A. Haq, and G. L. Smith (Torry Research Station, 135 Abbey Road, Aberdeen, Scotland)
Journal of Food Technology 7, No. 3, 281-290 (Sept. 1972)

The appearance of slits across fish fillets is called gaping. It is caused by a weakening of the tissue which holds the muscle segments (myotomes) together. Sometimes gaping can result in the complete disintegration of the flesh. Gaping is of economical importance because it reduces the value of the fish fillets. The extent of gaping in fish fillets may be influenced by the condition of the whole fish prior to preparation and freezing of the fillets, length of storage of the whole fish in ice, and the pH of the muscle of the fish. The present study was carried out to determine whether a particular size-range of cod fish was more prone to gaping than any other size range.

Fresh cod (Gadus morhua L.) were obtained periodically from a single commercial trawler operating within a 40-mile radius of Aberdeen, Scotland. The fish were dressed and the prepared fish were then frozen individually in an air-blast freezer at -30° C. The frozen fish were stored for about 1 month at -30° C. The fish were partly thawed at room temperature for 1 to 4 hr., then more completely thawed at 2° C. for 1 to 3 days, depending upon the size of the fish. Measurements were made for size of whole fish, pH of the muscle, and the extent of gaping of the thawed fillets.

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2.02 (0.36) BIOSYNTHESIS OF TRIACYLGLYCEROLS IN DOGFISH (SQUALUS ACANTHIAS) LIVER: INCORPORATION OF (1-^{14}C) PALMITIC ACID INTO ACYL CHAINS

Malins, Donald C., and Paul A. Robisch (Northwest Fisheries Center, National Marine Fisheries Service, NOAA, U.S. Dept. of Commerce, 2725 Montlake Blvd. East, Seattle, WA 98102)
Comparative Biochemistry and Physiology 43, No. 1B, 125-127 (Sept. 15, 1972)

Earlier work showed that the triacylglycerols of dogfish are actively metabolized in a cell-free preparation from the liver and that acyl chains of position 2 are more rapidly metabolized than those on positions 1,3 [D. C. Malins and J. R. Sargent, Biochemistry 10, 1107-1110 (1971)]. These findings relate to the validity of pathways that have been suggested for the biosynthesis of triacylglycerols in marine fish. In the present study, palmitic acid was administered to dogfish via intrahepatic injection and the uptake of radioactivity into acyl chains on positions 2 and 1,3 of the hepatic triacylglycerols was determined. The metabolic data were evaluated in terms of the fatty acid composition of the acyl chains.

There was a distinct preference for the incorporation of radioactivity into acyl chains of position 2 of triacylglycerols, indicating that these chains are actively metabolized. It appears that the biosynthesis of the hepatic triacylglycerols occurs primarily via the Kennedy-Weiss pathway rather than via acylation of 2-acylglycerols.

[2 tables, 10 references] FTP

2.02 (0.36)

LIPID TRANSPORT IN THE DUNGENESS CRAB, CANCER MAGISTER DANA

Allen, W. V. (Dept. of Biology, Humboldt State College, Arcata, CA 955201)
Comparative Biochemistry and Physiology 43, No. 1B, 193-207 (Sept. 15, 1972)

This article discusses preliminary information on the mechanisms of lipid transport in the Dungeness crab. Such knowledge of the means by which lipids are mobilized in the hemolymph is of use concerning crustacean metabolism and endocrinology. In this study the levels of hemolymph lipids of the Dungeness crab were determined.

The total concentration of the hemolymph lipids ranged from 14.9 to 94.0 mg%; females with developing ovaries showed the highest levels. The phosphatides, phosphatidyl ethanolamine, and phosphatidyl choline constituted from 65 to 85% of the total hemolymph lipids. Also, data are given on the concentrations of lipid classes in the hemolymph of the female and of the male crab, and on the fatty acid composition of hemolymph lipid classes.
[5 figures, 5 tables, 29 references]

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Small cod gape more than do large cod, particularly in the summer and autumn. However, in the winter and spring this size relationship may disappear or even be reversed. This reversal is probably caused by variations in the pH values of the two size groups (gaping increases as the pH falls), which can sometimes override the size effect.
[5 figures, 1 table, 9 references]

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apparatus bath was at the same temperature as the incubation bath for the myocommata strips. Cod, haddock, and catfish (Anarhichas lupus L.) were used in the tests. Phosphate buffers were used to provide the appropriate pH values between 6.2 and 7.2.

The mechanical strength of isolated myocommata of fish is altered by pH of the surrounding fluid; the effect is reversible. (The gaping of cod fillets--prepared from cod frozen in rigor mortis, thawed, and filleted--is then probably due in part to the lower pH of the muscle and not necessarily to a strong rigor contraction.) Myocommata become weakened when incubated at 15° C. or higher for 1 hr., but they regain their strength if they are subsequently cooled to 0° C., provided the original incubation temperature had not exceeded 30° C.

The myocommata of haddock are intrinsically stronger than those of cod. The gaping of haddock probably stems from their lower ultimate pH. The myocommata of the catfish are also stronger than those of cod, but catfish fillets do not exhibit gaping.

The authors found that chilled cod frozen in rigor mortis will be virtually free from gaping after thawing if either of the following conditions exist: water content of the muscle is 81% or more, if the ultimate pH is 6.9 or higher, or if the lactate content is 180 mg% or less.
[4 figures, 1 table, 19 references]

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1.0112 (1.34)

million. The catches in the southern and northern areas are expected to be 7.7 and 8.9 million, respectively. Escapement goals for 1972 are approximately 6 million pinks for southern southeastern and 4 million for northern southeastern Alaska. These goals are based in part on the 1972 returns being similar in magnitude and distribution to the 1972 forecast.
[6 figures, 6 tables, 6 references]

MS

2.112 (2.1121)

HOW TO PLAN AND CUT NETS

Hillier, Albert J. (Dept. of Fisheries and Marine Technology, University of Rhode Island, Narragansett, RI 02882)
University of Rhode Island Marine Bulletin Series, No. 8, 12 pp. (Sept. 1972)
Available from the Marine Advisory Service, University of Rhode Island, Narragansett Bay Campus, Narragansett, RI 02882.

This article shows how to plan (or scale) and cut the sections called bellies, squares, wings, and jibs of midwater and bottom nets.
[19 figures]

FTP

2.9 (6.54)(3.5)

WHOLESOMENESS OF FISHERY PRODUCTS. II. DIMETHYLNITROSAMINE IN SALTED CODFISH EGGS

Nakamura, Masayoshi, Mutsuo Usui, and Toru Fukumi (Japan)
Chemical Abstracts 77, No. 5, 32914g (July 31, 1972)

2.113

ORGANOLEAD COMPOUNDS IN ANTIFOULING PAINTS

Dick, Richard J. (Battelle Mem. Inst., Columbus, Ohio)
Chemical Abstracts 77, No. 10, 63431b (Sept. 4, 1972)

2.05 (0.5) ACTIVATION OF A TOXIC COMPONENT OF CLOSTRIDIUM BOTULINUM TYPES C AND D BY TRYPSIN

Eklund, M. W., and F. T. Poysky (Pacific Fishery Products Technology Center, National Marine Fisheries Service, NOAA, Seattle, WA 98102)
Applied Microbiology 24, No. 1, 108-113 (July 1972)

Reports of other studies indicated that toxigenicity of C. botulinum type C (strains 468C and Stockholm) and type D (strains 1873 and South African) required active and continued participation of specific bacteriophages. Loss of these bacteriophages results in a loss of the dominant toxin. In addition, it was found that isolates of strains Stockholm, 468C, and 1873, free of the bacteriophages, continue to produce low levels of a second toxin that is antigenically monospecific. The toxic properties of this toxin are manifest only after treatment with trypsin.

The trypsin activated toxic component was designated C_2. By using trypsin treatment this study demonstrated that some types C and D cultures previously thought to be nontoxic produce C_2 toxin.

Strains of types C and D were grown in medium containing 3% trypticase, 2% yeast extract, 0.2% glucose, and 0.1% cysteine hydrochloride (TYG medium), and in SFEM (Segner's Fortified Egg-Meat) medium containing 0.3% glucose and 0.5% ammonium sulfate (Applied Microbiology 22, 1017-1024 (Dec. 1971)). The cultures were incubated at 33° C. for 5 days.

Of 21 strains that produce C_1 toxin only one did not produce C_2 toxin. The C_2 toxin was detected in 14 of the culture supernatants only after trypsin treatment, and the toxin was detected in the untrypsinized supernatants of six cultures. Toxicity of these supernatants was increased by trypsin treatment. Of 19 strains

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2.119 (2.116) CHARTWORK FOR FISHERMEN AND BOAT OPERATORS

Motte, G. A. (Dept. of Fisheries and Marine Technology, University of Rhode Island)
University of Rhode Island Marine Bulletin, No. 7, 86 pp. (1972). Price $3.00. Available from the Marine Advisory Service, University of Rhode Island, Narragansett Bay Campus, Narragansett, RI 02882.

Chartwork is used to plot a ship's progress in sight of land; navigation is a similar process for ships out of sight of land. In chartwork, basic geometric concepts are applied to a ship's course, speed, bearings, and position lines. Navigation makes use of trigonometry to observations of celestial bodies and also uses position lines from electronic aids to determine a ship's position. This text covers basic definitions for position, fixing position near land, reading a chart, general chart layout, distance, the running fix, earth's magnetism, ship's magnetism, the compass, chart projections, practical chartwork, allowing for wind and tide, tides, the marine sextant, vertical sextant angles, horizontal sextant angles, rising and dipping of lights, lines of soundings, the three-bearing problem, the sailings, the traverse tables, plane sailing, and mercator sailing. There is an exercise at the end of each section FTP

2.119 AN ANALYSIS OF FATAL SKIN AND SCUBA DIVING ACCIDENTS

Schenck, Hilbert, Jr. (Dept. of Ocean and Mechanical Engineering, University of Rhode Island, Kingston, RI 02881), and John McAniff (Dept. of Ocean Engineering, University of Rhode Island)
Marine Technology Society Journal 6, No. 3, 41-48 (May-June 1972)

An analysis was made of 503 diving fatalities that occurred from the year 1946 to 1970. From 70 to 80% of this total sample resulted from scuba diving and half of the victims were in the 16 to 25 year age group. Between 8 and 13% of the persons involved were on their first scuba dive. Most of the cave diving fatalities involved failure on the part of the divers to use proper equipment; also, this accident group usually involved deeper dives. Although most autopsy reports gave "drowning" as the cause of death, there was some indication that about 25% of the fatalities may have involved lung over-pressures. The authors suggest six areas where it would be possible to help reduce the number of fatal accidents. These are (1) by stopping the sale of scuba to untrained persons, (2) by the control of cave diving operations, (3) by engineering and improved training studies of buddy breathing and buddy rescue, (4) by obtaining more complete accident investigation data, (5) by a redesign of life vests, and (6) by a simplification of the present weight, tank, and vest mounting systems.
[7 tables, 5 references] FTP

2.4 (1.51)(2.00) DANISH COD ROE EXPERIMENTS IN 1971

Anonymous
Årsberetning fra Fiskeriministeriets Forsøgslaboratorium for 1971 (Annual Report to the Danish Fishing Industry), pp. 32-37 (1972). Copenhagen, Denmark.

The changes occurring in cod roe were studied from the moment that it is removed from the freshly caught cod up to the time when it is considered unfit for human food.

The untreated cod roe is rich in nutritional factors. It consists of 20 to 24% protein and 1.5 to 2.5% fat; in addition, it contains large amounts of vitamins A, B, and D and iron, calcium, and phosphorus. In 1971, 1,670 tons of cod roe were landed in Danish ports.

In experiments with iced cod roe there were no marked changes during the first 5 days of storage of fresh roe. After a total of 7 days from catch an increasingly putrid odor was evident accompanied by a change to a bluish color. In cooked roe, after about 1 week of iced storage, the characteristic flavor changed to neutral, and the texture became rather dry. After 9 to 12 days, the cooked roe had a decayed, sour, and somewhat putrid flavor. The content of volatile bases and acids, the amount of hydrogen sulfide, and the redox potential are indicators of the quality changes in the roe. All the indicators except redox potential gave low results from tests of the iced roe for a week after catch. They rose sharply during the next few days. These changes are similar to those in iced gutted fish. The sharp increase in hydrogen sulfide is characteristic of cod roe (about 4 to 6 mg./kg. after 12 days). The high redox potential was of

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2.119 RESEARCH DIVER'S MANUAL

Somers, Lee H. (Dept. of Meteorology and Oceanography, College of Engineering, University of Michigan)
Sea Grant Technical Report No. 16, MICHU-SG-71-212, xvii + 366 pp. (Aug. 1972) (University of Michigan Sea Grant Program, Ann Arbor, MI 48105) Price not indicated.

This technical report contains a discussion of the basic principles of air diving with SCUBA (self-contained underwater breathing apparatus) and surface-supplied equipment. The primary emphasis is on diving in the Great Lakes. Future chapters will cover ocean diving, biological and research techniques, underwater photography, light salvage, underwater research procedures, mixed gases, and other specialized diving techniques. The chapters covered in the present manual are Introduction, Diving Physics, Physiology and Medical Aspects of Diving, Diving Procedures, Diving Without Breathing Apparatus, Self-Contained Diving, Surface-Supplied Diving, and Diving Environment.
[86 figures, 8 tables, 178 references, 6 appendixes] FTP

2.3 SHELLFISH PROCESSING MACHINE

Jones, John M., Jr. (Hertford, NC 27944); assignor to Mrs. Elvira Cheatham Jones, Henderson, NC 27536 (pat.)
U.S. Patent 3,698,038 (Oct. 17, 1972)

This apparatus is for automatically removing the heads, veins, and shells of shrimp, and for size-grading the shrimp in sequential steps. FTP

2.05 (0.5)

that do not produce C_1 toxin (thought to be nontoxic) 9 cultures produced C_2 toxin which required trypsinization to show toxicity, and 3 cultures produced C_2 toxin which did not require trypsin treatment for demonstrable toxicity. However, toxicity was increased by trypsinization. Only strain AOA113, of type D strains tested, produced C_2 toxin, and trypsin treatment was required.

Supernatant fluids of culture AO28 (does not produce C_1 toxin) were tested to determine effects of pH and incubation time at 37° C. on toxicity of C_2 toxin incubated with 0.25% trypsin. The pH and time required for maximum toxicity was 6.5 for 60 min.

The authors point out that type C and D cultures produce trypsin-activable toxin C_2; antiserum prepared for use against type C and D toxins should include the C_2 component.
[5 tables, 23 references] SW

0.5 GERMINATION REQUIREMENTS OF SPORES OF CLOSTRIDIUM BOTULINUM TYPE E

Ando, Yoshiaki (Hokkaido Inst., Public Health, Sapporo, Japan)
Chemical Abstracts 76, No. 25, 150911f (June 19, 1972)

2.4 (1.51)(2.00)

the order of +100 mv. during the first 5 to 7 days, then declined rapidly to about -100 mv. The decrease coincided with the increasing formation of hydrogen sulfide.

Organoleptic tests of iced roe vacuum packed in plastic bags, or stored directly on ice without protective covering, showed no differences; and storage life was judged to be the same for both, about 10 to 12 days. The content of volatile bases and hydrogen sulfide was higher in the packed roe. Roe in bags of either oxygen permeable or impermeable plastic gave similar results.

Initial counts of bacteria on cod roe were found to be 100,000/g.; experiments were performed to determine the effects of reduced initial counts on storage stability. Bacterial counts were reduced either by irradiation of normally removed roe after landing (0.1 Krad) and packing in individual polyethylene pouches or by aseptic removal of roe from the fish and packing in plastic bags without any contact with wooden surfaces. Irradiation reduced the initial count to just under 10,000/g. Subsequent growth of bacteria was highest in the irradiated roe; after 10 days storage, nonirradiated and irradiated roe showed the same count. However, irradiated roe was acceptable for human consumption 17 days after catch, while nonirradiated roe was spoiled 9 to 11 days after catch. In the aseptic removal technique, initial counts were 100 to 1,000/g. of roe. The storage life was about 17 days. Roe with initial counts of 100,000/g. and stored similarly had a storage life of 10 to 12 days.

The authors concluded that new methods should be found to reduce initial counts of bacteria in roe and that the use of clean plastic boxes, not dirty wooden boxes, would aid in attaining this goal.
[3 figures] SW

2.43 PACKAGING OF FROZEN PRODUCTS

Chevassus, F.
Rev. ATIP 26, No. 1, 1-13,15-29 (1972) (In French)
BFMIRA Abstracts 25, No. 10, Abstract No. 3791, 757 (Oct. 1972)

"A summary is given of the techniques of freezing and deep freezing, and the French market for deep frozen products is compared with that of other countries. A comparison is also made of different packaging systems and of packaging costs. Hot melt coatings and their characteristics, packaging machines and various types of closures are discussed. A great deal of information is presented in table format in this first part. In the second part, market constituents are discussed; packaging of vegetables, fruits, meats, seafoods. Production and packaging problems of the deep freeze product manufacturers are considered, and in the conclusion is a review of perspectives and trends with regard to the food and base production industries. In the final discussion, the 'food' board and its market, future, specifications, regulations are reviewed. The necessity to redefine the characteristics of the board as a function of its use, the concept of high speed deformation of a board and its importance, sticking the film to the paper, imperviousness of the paper to odours are all questions which received consideration. The type of paper and board expected to be produced in five years hence are discussed and lastly, the choice between using hot melts or polyethylene films is investigated." Reprinted

2.8 RECONSTITUTING PREPLATED FROZEN MEALS WITH INTEGRAL HEAT

Fries, J. A., and D. M. Graham (Dept. of Food Science and Nutrition, College of Agriculture, University of Missouri, 1-74 Agriculture Bldg., Columbia, MO 65201)
Food Technology 26, No. 11, 76-77, 80, 82 (Nov. 1972)

Integral heat, as defined here, is electrical resistance heat produced close to the plated food item. A special two-part casserole dish is used; it has a ceramic interior surrounded by a polymer shell. The polymer shell insulates the outside of the dish so that the dish remains cool while the food is cooking on the inner porcelain surface. A resistor is fused onto the surface of the inner porcelain dish, and metal contact points on the exterior of the dish conduct electricity from a power supply to the resistor. The covered dishes (containing the food) are fitted into a unit which supplies the power and serves as an oven (the atmosphere in the oven is not heated). Most of the heat generated in the plate is transferred directly to the food by conduction; cooking time and environmental temperature are reduced. A 9 to 12 oz. frozen meal can be reconstituted in 18-22 min. of heating time. [A description of integral heating was published in Food Technology 26, No. 9, 27-28 (Sept. 1972).]

This article reports the results of comparative tests (organoleptic, nutritive retention, and weight and moisture loss) of foods cooked with integral heat and with conventional (convection) heat. The meals consisted of the following items: a seared 5-oz. beef tenderloin fillet, 2 oz. of frozen blanched peas, and 2 oz. of canned new potatoes browned in a butter, salt, and paprika mixture. The

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3.12 FISH PRESERVATION

Hastensen, H., and H. Hov (pat.)
Canadian Patent 906,308
Food Technology 26, No. 11, 127 (Nov. 1972)

Fish are preserved aboard vessel or ashore by placing them in containers of a preserving agent (such as brine containing an enzyme absorbing agent). FTP

3.12 SHELLFISH PRESERVATION

Walker, E. L. (pat.)
Japanese Patent 17545/72
Food Technology 26, No. 10, 101 (Oct. 1972)

The shellfish meat is immersed in salt solutions containing antibiotics, then heated to 180°-210° F. FTP

3.12 (4.60) THE USES OF SULPHUR DIOXIDE IN THE FOOD INDUSTRY. A REVIEW

Roberts, A. C., and D. J. McWeeny (Ministry of Agriculture, Fisheries and Food, Food Science Division, Food Research Institute, Colney Lane, Norwich NOR 70F, England)
Journal of Food Technology 7, No. 3, 221-238 (Sept. 1972)

The uses of sulfur dioxide as a food additive are classified below together with some representative examples of these uses.

1. For the inhibition of nonenzymic browning.--Nonenzymic browning is the result of reactions between amino groups and active carbonyl groups leading to the formation of insoluble dark colored polymers. These reactions in foods cause a darkening of color, production of different flavors, and sometimes the production of insoluble material. Examples of such use of sulfur dioxide involve canned heat-processed foodstuffs (comminuted meats--sausages); dehydrated products (pork, chicken, milk, vegetables); frozen products (fruits, vegetables); stored products (wines); and sugar.

2. For inhibition of enzyme-catalyzed browning reactions.--Enzymic browning results from the production of pigment as the result of enzymatically oxidized phenolic compounds of natural origin. Examples of such use of sulfur dioxide involve dehydrated products and those having low water activity (freeze dried vegetables, fruits in sugar solution), and hydrated products having high water activity (pickled onions, pickled horseradish, prepeeled potatoes).

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3.17 (3.12) PRESERVATION OF HAKE IN TREATED ICE

Wessels, J. P. H., Engela Lamprecht, J. de A. Rodrigues, and C. K. Simmonds (Fishing Industry Research Institute, University of Cape Town, Private Bag, Rondebosch, Cape Province, South Africa)
Journal of Food Technology 7, No. 3, 303-307 (Sept. 1972)

The South African fishing industry needed to obtain a relatively small increase in the storage life of its whitefish. Therefore, the present experiments were carried out to determine the effectiveness of various antimicrobial agents included in ice for lengthening the storage life of hake. The chemicals used were sodium EPHB [the letters were not defined], ethylenediaminetetraacetate (EDTA) plus TPP [presumably tripolyphosphate], propylene glycol, potassium sorbate, sodium propionate, sodium benzoate, and a commercial product of unknown composition. Sodium benzoate and potassium sorbate were also tested in combination. The dressed hake were packed in the antiseptic ices. The ices were prepared in a flake ice machine using tap water and the test chemicals. Organoleptic tests and bacterial counts were made of the samples to assess their condition during storage.

All the ices containing the additives prolonged the storage life of dressed hake. Generally, 0.5% sodium benzoate showed the best preservative action, with 0.3% sodium benzoate slightly poorer. The combination of potassium sorbate and sodium benzoate generally failed to give better results than did the sodium benzoate by itself. Ice containing sodium benzoate melted more slowly than did ice containing no additives.

[1 table, 13 references] FTP

3.12 (4.60)

3. For use as an antioxidant and as a reducing agent.--As an antioxidant, sulfur dioxide is used in fruit juices and comminuted meats; it also serves as a reducing agent in meats.

4. For inhibition and control of microorganisms.--Sulfur dioxide is used to help delay growth of molds, yeast, or bacteria on fruits and in sausages.

The most specific use of sulfur dioxide is for its ability to inhibit nonenzymic browning in a variety of foods and in a variety of processes; in this mode of action, the authors believe that there is no substitute. Alternatives to the use of sulfur dioxide include lowering of pH, dehydration to low water content, separation of active species, and addition of sulfhydryl compounds; however, these alternatives are limited in action or have been applied only to laboratory scale or pilot scale work.

Heat-inactivation of enzymes in foods [blanching] may be an alternative to use of sulfur dioxide. As an antioxidant or reducing agent in foods, it might be replaced by a variety of permitted chemicals--ascorbic acid, the tocopherols, cysteine, and glutathione. As an inhibitor of microorganisms in food, sulfur dioxide might be easily replaced by various more effective inhibitors such as lactic acid, propionic acid, benzoic acid, and p-hydroxybenzoic acid. If use of sulfur dioxide in foods is limited to those applications concerned with controlling nonenzymic browning, the dietary intake of sulfur dioxide could be substantially reduced. [2 tables, 119 references]

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3.12 (3.5) NUTRITIVE ANTIOXIDANTS AND THEIR INHIBITING ACTION ON THE OIL OF PICKLED ATLANTIC HERRING

Pechatina, V. I. (U.S.S.R.)
Chemical Abstracts 77, No. 7, 46882g (Aug. 14, 1972)

3.12 REACTION BETWEEN FORMALDEHYDE AND FISH PROTEINS

Lipparini, Luigi (Ist. Merceol., Univ. Bologna, Bologna, Italy)
Chemical Abstracts 77, No. 7, 46887n (Aug. 14, 1972)

3.12 FOOD ADDITIVES FOR FISHERY PRODUCTS.
I. EFFECTS OF VITAMIN B1 LAURYL SULFATE ON MOLD GROWTH

Sakamoto, Masakatsu, and Teruhiko Sato (Japan)
Chemical Abstracts 77, No. 5, 32919n (July 31, 1972)

2.8

meals were stored at -20° F. until just prior to cooking. Integrally heated meals were reconstituted in the dishes for 21 min. Convection heated meals were reconstituted in an airlines-type convection heater at 350° F. for 40 min. The cooking times were selected on the basis of the length of time required to heat all the components in all the meals to at least 140° F.

The organoleptic ratings and the nutritive retention was generally better for the food reconstituted by integral heating than for the food reconstituted by convection heating. Furthermore, the weight and moisture loss for the integral heated foods was less. The authors conclude that integral heat has unlimited possibilities for the food industry, the government, and the consumer. [3 figures, 9 tables, 3 references]

FTP

3.12 FISH PRESERVATION

Ueno Seiyaku KK (pat.)
Japanese Patent 22263/72
Food Technology 26, No. 11, 128 (Nov. 1972)

Alkali metal salts of saturated carboxylic acids are used to preserve fish paste foods.

FTP

2.43 THE QUANTITATIVE DETERMINATION OF ADDITIVES FOR PLASTICS IN FOOD MODEL SYSTEMS. I. DIRECT DETERMINATION IN FAT MODEL SYSTEM HB 307 BY u-v SPECTROSCOPY

Koch, J.
Dt. Lebensmittelrdsch. 68, No. 7, 216-221 (1972) (In German; English summary)
BFMIRA Abstracts 25, No. 10, Abstract No. 3808, 761 (Oct. 1972)

Methods for the determination of antioxidants, heat stabilizers, u-v stabilizers and plasticizers for plastics are given. C.S.B. Reprinted

3.230 RECOMMENDATIONS FOR THE PROCESSING AND HANDLING OF FROZEN FOODS

Bramsnaes, F. (chairman)
Prepared by the International Institute of Refrigeration Working Party on Frozen Foods.
Annexe au Bulletin de l'Institut International du Froid (International Institute of Refrigeration), 177 Boulevard Malesherbes, Paris, France (2d edition, 1972), 236 pp. (In English and French). Paper bound $9 or F45 (Special rates for quantity orders; 10 to 25 copies, $8 or F40 each; 26 to 49 copies, $7 or F35; over 50 copies, $6 or F 30.)

The first edition of this bulletin was published about 10 years ago. This new second edition includes new knowledge acquired during the interim period. A team of 19 experts of the International Institute of Refrigeration prepared this new edition.

The first section provides a definition of terms (frozen foods, equilibrium temperature, freezing rate, etc.). The next section deals with the general principles for the freezing, storing, and thawing of foodstuffs: (1) Scientific background, including the physical, physico-chemical, and biochemical aspects of freezing; microbiology; and temperature measurement. (2) Applications, including hygiene in the preparation of frozen products, packaging, freezing, storage, time-temperature tolerance, transport, display and retail sale, thawing, nutritional aspects, and consumer applications. The final (new) section is devoted to the freezing of vegetables, fruits, meats, seafoods, poultry, eggs and egg products, milk products, prepared foods, bakery and confectionery products, and edible ices,

(over)

3.30 CANNED FISH PRODUCT

Sanko Shokuhin KK (Pat.)
Japanese Patent 22261/72
Food Technology 26, No. 11, 128 (Nov. 1972)

Flaked boiled fish are coated with a starch gum containing antioxidant, then packed in cans. The sealed cans are then sterilized. FTP

3.330 EFFECT OF THE TYPE OF FISH AND THE DEGREE OF ITS FRESHNESS ON THE COLOR OF THE TOMATO SAUCE IN CANNED GOODS

Safronova, T. M. (U.S.S.R.)
Chemical Abstracts 77, No. 9, 60215y (Aug. 28, 1972)

3.2344 FISH BLOCK PRODUCT

Hokkaido KK (pat.)
Japanese Patent 17825/72
Food Technology 26, No. 11, 127 (Nov. 1972)

Skinless fillets are first immersed in polyphosphate solution, then mixed with a binder consisting of comminuted white fish, sodium chloride, and polyphosphate. The mixture compressed into a block, is then frozen.

FTP

3.2344 FREEZING PROCESS

Nippon Seisan Kaisha Ltd. (pat.)
Japanese Patent 22262/72
Food Technology 26, No. 11, 128 (Nov. 1972)

Plastic film layer is placed between food block and freezing surface to facilitate separation of the block. FTP

3.3349 (ACCIDENTS) SLIPS AND FALLS. PART 1. ASSESSING THE INITIAL PROBLEMS. PART 2. SAFETY ASPECTS OF FLOOR CARE

Anonymous
FMF Rev., pp. 10-12 (April 1972); pp. 8, 10, 12 (May 1972)
BFMIRA Abstracts 25, No. 10, Abstract No. 3737, 748 (Oct. 1972)

In the first part typical accidents occurring in factories and their causes are outlined with a brief mention of legal requirements intended to minimize hazards to workers. Part 2 concerns itself, as the title suggests, with the particular aspect of floor safety and measures which must be taken to ensure minimum danger from this source. A useful table of the physical properties of 14 types of flooring is given. D.M.L. Reprinted

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3.3349 ENCOURAGING A POLICY OF SAFETY INVESTMENT

Pettie, J. T.
FMF Rev. pp. 24-25 (July 1972)
BFMIRA Abstracts 25, No. 10, Abstract No. 3813, 762 (Oct. 1972)

Special problems of safety and health of employees in the food industry are discussed and the work of FMF in helping to reduce these problems is outlined. D.W.F. Reprinted

3.331 (9.19) EFFECT OF PROCESSING ON THE MERCURY CONTENT OF CANNED TUNA

Pirati, Duilio, Pietro Pirazzoli, Stefano Gherardi, and Gabriele Guidi (Italy)
Chemical Abstracts 77, No. 5, 32840e (July 31, 1972)

3.2 THE IMPROVEMENT OF THE COOLING LINE IN STORAGE

Junge, B.
Lebensmittel-Ind. 19, No. 8, 329-333 (1972) (In German, English summary)
BFMIRA Abstracts 25, No. 12, Abstract No. 4414, 534 (Dec. 1972)

The author is mainly concerned with freezing and frozen storage of meat but butter and fish are also considered. R.A. Reprinted

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3.230

and includes a chapter on the practical storage life of frozen products. It is suitably indexed and contains a bibliography of 26 references.

This book should be useful to frozen food processors, distributors, and retailers, and to administrative or regulatory personnel concerned with controlling or regulating the industry. FTP

3.331 APPARATUS FOR CANNING FISH

Mencacci, Samuel A. (Saratoga, CA 95070); assignor to International Machinery Corporation S.A., St. Nicklass-Waas, Belgium (pat.)
U.S. Patent 3,700,386 (Oct. 24, 1972)

This apparatus is used for filling cylindrical containers with chunk tuna or the like; it minimizes the tendency of the fish to adhere to the surfaces of the filling apparatus. FTP

3.7 FISH-SOYBEAN FOODSTUFF

Ichihata, H.; Morinaga Confectionery Co. (pat.)
U.S. Patent 3,663,234
Food Technology 26, No. 8, 95 (Aug. 1972)

A mixture of refined fish meat and soy curd or bean soup is molded. The prepared mixture is then steam heated, followed by refrigeration and drying. FTP

3.330 NEW INFORMATION ON THE MANUFACTURE OF CANNED FOODS

Reichert, J. E.
Fleischerei 23, No. 3, 11-12 (1972) (In German)
BFMIRA Abstracts 25, No. 5, Abstract No. 1792, 364 (May 1972)

In this short dissertation on the manufacture of canned meat and meat products, the influence of the F value on the keeping quality, the evaluation of the heating process by means of F, E and C values and the connection between the heating temperature and the thermal conductivity of the product are considered. The sterilization temperatures necessary for various meat products are mentioned with respect to the latter. C.S.B. Reprinted

3.231 (3.234) FROZEN FOODS, A WHOLE RANGE OF FROZEN PRODUCTS

Dutrieux, L.
Rev. Conserve Aliment. mod., Nos. 7/8, 72-78 (1972) (In French)
BFMIRA Abstracts 25, No. 12, Abstract No. 4372, 523 (Dec. 1972)

A French firm which specialises in frozen seafood products, is described including details of processes and equipment. R.A. Reprinted

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3.239 REVERSIBILITY OF THE FREEZING PROCESS

Chernyshev, V. M., L. D. Serazhutdinova, and L. A. Shkermontova (U.S.S.R.)
Chemical Abstracts 77, No. 7, 46872d (Aug. 14, 1972)

4.19 (0.31) PRESENCE OF TRANS-6-HEXADECENOIC ACID IN THE WHITE JELLYFISH AURELIA AURITA LAMARCK AND IN A CARIBBEAN GORGONIAN

Hooper, S. N., and R. G. Ackman (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)
Lipids 7, No. 9, 624-626 (Sept. 1972)

Reports from other work indicated that trans-6-hexadecenoic acid (THD) had been isolated from the depot fat of the leatherback and two other marine turtles. In addition, the fatty acid had also been found in the ocean sunfish and the sea anemone (Metridium dianthus).

Analysis of lipid from the white jellyfish and the gorgonian indicated that 2% and 0.9% consisted of THD, respectively. The methods of analysis used were thin-layer and gas-liquid chromatography. No indication of a specific metabolic or functional value for THD has been found after a study was made of the distribution of the fatty acid in the tissues and organs of the leatherback turtle. Invertebrates easily accumulate free fatty acids from sea water. The authors suggest that the origin of THD in jellyfish and gorgonian could be from the dissolved fatty acids in the sea water. Since jellyfish are part of the diet of leatherback turtles and sunfish, the authors suggest that THD found in the lipid of these animals could have originated with the lower forms.

[1 table, 12 references] SW

4.9 (9.14) EFFECT OF DIETARY LINOLENIC ACID AND DOCOSAHEXAENOIC ACID ON GROWTH AND FATTY ACID COMPOSITION OF RAINBOW TROUT (SALMO GAIRDNERI)

Yu, T. C., and R. O. Sinnhuber (Dept. of Food Science and Technology, Oregon State University, Corvallis, OR 97331)
Lipids 7, No. 7, 450-454 (1972)

Linolenic and related fatty acids (ω3) have been found to be essential for rainbow trout. Only linolenic acid has been used to study the ω3 fatty acid requirements of fish thus far. Experiments were performed to isolate the long chain unsaturated docosahexaenoic acid (22:6ω3) from fish oil and to compare the effect of this fatty acid with that of linolenic acid on growth and fatty acid composition of rainbow trout.

Oil extracted with chloroform-methanol from freeze-dried roe of Pacific coho salmon was the source of laboratory prepared docosahexaenoic acid. The methyl linolenate (18:3ω3) used was a commercial preparation.

Semipurified diets incorporating methyl linolenate and docosahexaenoic acid at several levels were fed to rainbow trout previously maintained on a fat-free diet. After 14 weeks, the weight gain, the extent of feed conversion of the fish on each diet, and the fatty acid composition of the lipid from each group of fish were determined.

The control group of fish, which did not receive either methyl linolenate or docosahexaenoic exhibited a shock syndrome, poor appetite, and very slow growth rate. Tissue fatty acid analysis by gas-liquid chromatography (GLC) of this group

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4.9 ODD NUMBERED AND NEW ESSENTIAL FATTY ACIDS

Schlenk, H. (University of Minnesota, The Hormel Institute, Austin, MN 55912)
Federation Proceedings 31, No. 5, 1430-1435 (Sept.-Oct. 1972)

Odd numbered straight-chain fatty acids occur widely in natural lipids, but the percentages of these fatty acids in total fatty acids are small and only a minor amount is polyunsaturated. In higher animals the fatty acids contain between 1 and 5% odd numbered chains. Up to 50% of lipids in microorganisms are composed of odd numbered fatty acids. These fatty acids generally are found more in marine than in terrestrial animals.

The author speculated on the biosynthesis of odd numbered fatty acids. Of the modes of synthesis mentioned one was through a precursor different from acetic acid which leads to synthesis of odd long chains and subsequent desaturation and elongation by two carbon units resulting in polyunsaturated odd acids. In reports of other work, propionic acid has been suggested as the starter for synthesis of odd numbered fatty acids. Anaerobic chain synthesis with acetate as the starter has also been suggested as a pathway to synthesis of odd numbered fatty acids.

Vertebrates lack the ability to synthesize the even numbered linoleic and linolenic acids, but they are able to elongate and desaturate these acids supplied in the diet. The same principles are applicable to odd numbered acids. The similarities of odd and even fatty acids in structure and in metabolism have instigated experiments in other laboratories to test polyunsaturated odd numbered acids for essentiality. Reports from these sources indicated odd numbered ω5 acids could be substituted for even numbered ω6 acids in functions of essentiality.

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5.112 (0.35) VITAMIN A AND PROTEIN METABOLISM

Roels, Oswald A. (Lamont-Doherty Geological Observatory of Columbia University, Palisades, NY 10964), and James P. Mack (Dept. of Biology, City College, City University of New York, New York, NY 10031)
Journal of Agricultural and Food Chemistry 20, No. 6, 1133-1135 (Nov.-Dec. 1972)

This paper reviews work concerning the relationship between vitamin A and protein in humans and animals. Outside its function in the visual process, the exact function of vitamin A is not known. It is necessary for growth; therefore, it is linked to protein metabolism.

Studies related to humans indicate that vitamin A deficiency and protein malnutrition often occur together; absorption of dietary vitamin A is impaired in acute protein malnutrition; mobilization of vitamin A from the liver is hampered in protein-calorie malnutrition; dietary protein is required to mobilize liver reserves of vitamin A in the bloodstream; and increased protein intake results in greater requirements for vitamin A.

Animal studies demonstrated that vitamin A influences in vivo synthesis of serum proteins; in vitro synthesis of muscle protein; in vitro synthesis of glycoprotein in the intestinal mucosa due to a factor in the pH 5 fraction; and in vitro synthesis of glycoproteins in the cell membrane.

The mechanisms whereby vitamin A influences protein metabolism are yet unknown; it is not clear whether the effect of vitamin A on protein synthesis is direct or indirect.

[28 references] FTP

4.9

Prostaglandins obtained from $\omega 5$ and $\omega 7$ odd numbered acids were found to be physiologically highly active.

Concurrent essentiality and formation of active prostaglandins has been reported, with the linoleic acid type and corresponding odd numbered $\omega 5$ and $\omega 7$ acids, but the author believes that attempts to show essential fatty acid activity of prostaglandins have failed. He believes that more attention should be given to the role of highly unsaturated fatty acids in organisms where they are not essential but synthesized in large amounts. He suggests the functions of these acids might give clues for their function in higher animals.
[1 figure, 6 tables, 76 references] SW

4.64 ANTIOXIDANTS

Eisai Co. Ltd. (pat.)
Japanese Patent 22789/72
Food Technology 26, No. 11, 133 (Nov. 1972)

This food antioxidant mixture contains natural vitamin E. FTP

4.64 ANTIOXIDANTS

Fujisawa Pharmaceutical Co. Ltd. (pat.)
Japanese Patent 23026/72
Food Technology 26, No. 11, 133 (Nov. 1972)

These antioxidant mixtures contain butyl hydroxyanisole and dibutyl hydroxytoluene. FTP

4.9 (0.31) EFFECT OF NORWAY HADDOCK OIL AND COCOA FAT ON THE LIPID AND FATTY ACID CONTENT OF LIVER AND SPLEEN OF RATS

Reimold, W. V., and E. Lang (Physiol.-Chem. Inst., Univ. Mainz, Mainz, Germany)
Chemical Abstracts 77, No. 1, 466w (July 3, 1972)

4.9 (0.36) CHANGES IN RAT HEART MUSCLE LIPID AND FATTY ACID CONTENT UNDER THE INFLUENCE OF NORWAY HADDOCK OIL AND COCOA FAT IN A LONG-TIME FEEDING EXPERIMENT

Lang, K., and W. V. Reimold (Physiol.-Chem. Inst., Univ. Mainz, Mainz, Germany)
Chemical Abstracts 77, No. 1, 467x (July 3, 1972)

4.90 (0.31) CHANGES IN THE LIPID AND FATTY ACID CONTENT IN RAT KIDNEY TISSUE UNDER THE INFLUENCE OF NORWAY HADDOCK OIL AND COCOA FAT

Reimold, W. V., and K. Lang (Physiol.-Chem. Inst., Univ. Mainz, Mainz, Germany)
Chemical Abstracts 77, No. 1, 468y (July 3, 1972)

4.4 (5.112) (5.7) KEEPING QUALITY OF COD-LIVER OIL WITH SPECIAL REGARD TO ITS VITAMIN A CONTENT

Meine, W. (Chem. Lebensmitteluntersuchungsanst., Hamburg, Germany)
Chemical Abstracts 77, No. 7, 46819s (Aug. 14, 1972)

4.90 METABOLISM OF COD-LIVER OIL IN RELATION TO MILK FAT SECRETION

Brumby, P. E., J. E. Storry, and J. D. Sutton (Natl. Inst. Res. Dairying, Shinfield/Reading, England)
Chemical Abstracts 77, No. 5, 33264g (July 31, 1972)

4.9 (9.14)

showed eicosatrienoic (20:3ω9) acid accumulated in the phospholipid fraction. The 20:3ω9 level was lowered when either 18:3ω3 or 22:6ω3 was included in the diet.

Both methyl linolenate and docosahexaenoic acid, fed at the 1% level, supported maximum growth of the fish. Results of GLC analyses showed that methyl linolenate was rapidly converted by the fish into docosahexaenoate, with a high concentration in the phospholipid. Dietary docosahexaenoate fed to the fish remained unchanged, and little or no reconversion of this fatty acid was observed.
[1 figure, 5 tables, 18 references] SW

4.64 DETERMINATION OF ANTIOXIDANTS IN FOODS

Halot, D.
Chim. analyt. 53, No. 12, 776-782 (1971) (In French)
BFMIRA Abstracts 25, No. 12, Abstract No. 4178, 478 (Dec. 1972)

"Methods of separation, detecting and determining six commercially used antioxidants, each in concn. $\leq$ 0.01%, are reviewed. (48 references)"

Reprinted FTP

5.122.
(5.128)

SYNTHETIC VITAMIN A IN ANIMAL APPLICATIONS

Bauernfeind, J. C., and E. DeRitter (Depts. of Biochemical Nutrition and Product Development, Hoffmann-La Roche Inc., Nutley, NJ 07110)
Feedstuffs 44, No. 50, 34-36, 56 (Dec. 4, 1972)

Vitamin A (retinol), in addition to specific activity in vision, is necessary for growth, reproduction, the maintenance of the mucus-secreting cells of the epithelia, the synthesis of glycoproteins (constituents of plasma and saliva), and the prevention of keratinization (development of a hornlike quality in tissue). A short history of vitamin A is presented including manifestations of diet induced vision difficulties and cures recorded in ancient civilizations, its comparatively recent discovery and requirement by man and animals, and later synthetic production in large quantities.

The occurrence of vitamin A is confined to mammals, birds, and fish life; none exists in plants. Before the era of synthetic production, the principal source of vitamin A was the liver and/or body oils of marine fish. Fish ingest carotenoids with food plankton, lower plants, algae, and crustaceans and build up stores of vitamin A from these sources. Plants contain a wide variety and, at times, high concentrations of carotenoids especially of provitamins A. Vitamin A of animal life can be viewed as a degradation product of the carotenoid provitamins A of plant life.

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(8.42)

DETERMINATION OF LEAD IN FISH BY ATOMIC ABSORPTION SPECTROPHOTOMETRY AND BY POLAROGRAPHY. II. COLLABORATIVE STUDY

Gajan, Raymond J., and Damon Larry (Food and Drug Administration, Washington, DC 20204)
Journal of the Association of Official Analytical Chemists 55, No. 4, 733-736 (July 1972)

In part I of this study spectrophotometry and polarography techniques were selected as acceptable in determination of trace lead in fish.

To gain information on reproducibility of results 19 laboratories, using 6 different atomic absorption spectrophotometers and 4 different types of polarographs, participated in a collaborative study. Most collaborators reported no difficulties with the methods.

The average lead recoveries from 6 paired samples at 1 and 2, 5 and 6, and 10 and 11 p.p.m. levels were 97.7% by polarography and 100.7% by atomic absorption. The average standard deviations were 0.32 and 0.41 p.p.m., respectively; the average coefficients of variation were 7.9 and 13.1%, respectively. Since there were no significant differences between the two methods they can be used to confirm each other at the 1, 2, 5, 5, 10, and 11 p.p.m. levels.

The authors recommend that dry ashing of samples followed by atomic absorption or polarography be adopted as official first action for the determination of lead in fish.

[4 tables]

SW

6.85
(8.)

CHEMICAL AND PHYSICAL CHARACTERIZATION OF BARNACLE CEMENT

Otness, J. S., and D. G. Medcalf (Dept. of Chemistry, University of Puget Sound, Tacoma, WA 98416)
Comparative Biochemistry and Physiology 43, No. 2B, 443-449 (Oct. 15, 1972)

Barnacles secrete two cements; the first, a mucous material, is involved in the initial attachment of the organism, and the second enables the organism to repair small cracks in its base and to reattach itself in case of detachment. The cement is one of the strongest adhesives known. It is of interest, therefore, relative to its potential use in dental restoratives. Earlier workers [J. R. Saroyan, E. Lindner, C. A. Dooley, and H. R. Bleile, Ind. Eng. Chem. Prod. Res. Develop. 9, 122-133 (1970)] have studied the nature of the adhesive secretions before solidification. The cement is considered to be of proteinaceous material.

In the present study, an attempt was made to determine the chemical composition and physical characteristics of the solidified barnacle cement. Using these data and those of earlier workers, the authors proposed a mechanism for the cementing process.

The acorn barnacle Balanus glandula and the giant barnacle B. nubilus from Puget Sound were used as the source of cement. Samples of unsolidified cement were obtained by placing an acorn barnacle on a ribbed tray in a tank containing circulating sea water. Samples of solidified cement were obtained from the giant barnacle. Qualitative analyses of the unsolidified and solidified cements and of sea water were made for P, S, Cl, K, Ca, Cr, Fe, I, and Sr. Crystallinity of the

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7.42
(8.42)

DETERMINATION OF LEAD IN FISH BY ATOMIC ABSORPTION SPECTROPHOTOMETRY AND BY POLAROGRAPHY. I. DEVELOPMENT OF THE METHODS

Gajan, Raymond J., and Damon Larry (Food and Drug Administration, Washington, DC 20204)
Journal of the Association of Official Analytical Chemists 55, No. 4, 727-732 (July 1972)

The present Association of Official Analytical Chemists (AOAC) methods for the determination of lead require ashing the sample, extraction with dithizone or as the sulfide, followed by colormetric analysis of the dithizonate in Nessler tubes or in a spectrophotometer.

A reliable method for the determination of trace amounts of lead in fish was needed. Colorimetric analysis was not sufficiently specific for trace amounts. Based on work of the U.S. Department of Commerce, National Bureau of Standards, (Technical News Bulletin, NBS-STR 4261, (June 1971) the polarographic technique was selected as suitable for trace analysis. Atomic absorption spectrophotometry (AAS) was selected as a check method in the development of the polarographic technique.

Samples of fish weighing about 20 g. each were dry ashed at 500° C. The resulting ash weighed about 1.3% of the sample. The ash was dissolved in 1N HCl and analyzed for lead by AAS and by polarography.

Good agreement between the two techniques was observed at levels of 1.0 to 10.0 p.p.m.; however, below 1.0 p.p.m. AAS measurements were biased. The bias was overcome by increasing the sample size fourfold. For polarography the average

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6.85 (8.)

solidified cement and shell was examined by X-ray diffraction. Amino-acid analyses were made of the solidified cement and the shell. The shell and solidified cement were tested for chitin. The solidified cement was analyzed for iodotyrosine.

The solidified barnacle cement appears to be predominantly calcium carbonate in a proteinaceous matrix. The crystalline form of calcium carbonate was calcite. The elements P, S, Cl, K, Ca, Cr, Fe, and I were found in the solidified cement, unsolidified cement, and sea water. Sr was present in the solidified cement and in sea water. Chitin and iodotyrosine were also detected in the solidified cement.

The nitrogen content (N·6.25) of the solidified cement was 4.4% and of the unsolidified cement was 79.7%.

The amino-acid content of the protein fractions from the shell and from the solidified cement were significantly different, particularly with regard to their glycine content. The glycine content (expressed as residues/100 residues) in the solidified cement was 16.43 and in the shell was 30.04. These fractions also were high in acidic amino acids.

Stained thin sections of the solidified cement showed a laminated array of protein matrices surrounded by calcium carbonate (as calcite). The authors therefore suggest that the anionic groups on the matric proteins may serve as sites for nucleation during calcification.
[1 figure, 3 tables, 18 references] FTP

7.42 (8.42)

recovery from various species of fish was 100.7 plus or minus 9.0% and for AAS 95.7 plus or minus 9.2%.

The authors suggest that the polarography method may be used as the determinative step for lead levels of about 0.1 p.p.m.; AAS may be used at the 1.0 p.p.m. level. [4 tables, 15 references] SW

8.4 FLUORINE CONTENT OF SOME CHILEAN MARINE SPECIES

Lopez Etchegaray, Monica (Chile)
Chemical Abstracts 77, No. 1, 3967w (July 3, 1972)

5.122 (5.128)

Carotenoid provitamins are best utilized at low levels in the diet. As the level is increased the efficiency of conversion to vitamin A decreases markedly. Conversion depends on the animal species. Ratios of biological effectiveness of ß-carotene for various species were summarized. The vitamin can be given as a daily supplement in feed or drinking water of the animals or by oral or parenteral routes. The greater amounts of vitamin A used today are blended in the dry feed. Application of fish oils for this purpose have been declining since the advent of synthetic vitamin A.

Use of the synthetic vitamin A has made available dry stable forms for mixture in feeds. The dry forms incorporate antioxidants and other ingredients which provide for physical stability in particle form with biological availability. In addition to dry feeds synthetic vitamin A may be used to supplement liquid feeds and also in drinking water.

Tables are included which show deficiency symptoms, functions, factors influencing requirement for, and animals requiring, vitamin A. Other tables summarize application forms, mode of administration, and stability data of the forms of vitamin A. In addition, a table gives the historical events associated with vitamin A from the years 1831 to 1970 with references.
[3 figures, 9 tables, 11 references] SW

7.42 DETERMINATION OF MERCURY IN TUNA-FISH.
II. IMPROVED METHOD OF DIGESTION

Carisano, A., M. Riva, and A. Daghetta
Industria Conserve 47, No. 2, 115-116 (1972) (In Italian)
BFMIRA Abstracts 25, No. 12, Abstract No. 4201, 482 (Dec. 1972)

The method of acid digestion of tuna prior to atomic absorption spectrophotometry to estimate mercury content reported previously (Ibid 1971, 46, 194) has been modified in order to avoid the possibility of a violent reaction being produced by the sealed vial containing the sample. C.C. Reprinted

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7.42 THREE METHODS FOR THE DETERMINATION OF MERCURY IN CANNED TUNA

Henrioul, A., et al.
Annls Falsif. Expert Chim. 65, No. 702, 274-278 (1972) (In French)
BFMIRA Abstracts 25, No. 12, Abstract No. 4202, 482 (Dec. 1972)

The 3 methods considered are colorimetric using dithizone, atomic absorption and nuclear reaction. Indications of the test methods are given. C.S.B. Reprinted

7.6 GAS CHROMATOGRAPHY OF THE FAT-SOLUBLE VITAMINS: A REVIEW

Sheppard, A. J., A. R. Prosser, and W. D. Hubbard (Division of Nutrition, Food and Drug Administration, Washington, DC 20204)
Journal of the American Oil Chemists' Society 49, No. 11, 619-633 (Nov. 1972)

This is a review of the published work on the application of gas-liquid chromatography (GLC) as an analytical tool for the determination of the fat-soluble vitamins A, D, E, and K. GLC has yet to be used to its full potential in this area.

The use of GLC methods to determine the vitamin A isomers has not been developed to any appreciable practical extent. The author suggests that liquid–liquid chromatography might be the method of choice. Practical GLC analysis for vitamin D may be feasible for pharmaceutical preparations. Use of GLC for vitamin E determinations are diverse, well defined, and are generally accepted in research laboratory work and for regulatory and quality control uses. GLC methods for vitamins K_1 and K_2 have not been developed on a practical basis. However, GLC methods are used for measuring vitamin K_3 (menadione and menadione sodium bisulfite) on a routine basis in quality control laboratories.

[10 figures, 100 references] FTP

7.9 (9.3)(3.3) IDENTIFICATION OF SPECIES OF HEAT-STERILISED CANNED FISH BY POLYACRYLAMIDE-DISC ELECTROPHORESIS

Mackie, I. M., and T. Taylor (Ministry of Agriculture, Fisheries and Food, Torry Research Station, P.O. Box 31, 135 Abbey Road, Aberdeen, AB9 8 DG, Scotland)
Analyst 97, No. 1157, 609-611 (Aug. 1972)

Electrophoresis of the water-soluble proteins of fish muscle is a sensitive method used for identifying fish species; it is also used to identify species of portions such as fillets. Initially the method was limited to raw or partially cooked fish. A modification of the method made possible species identification of heat-sterilized canned fish.

The modification of the initial method is based on the specific cleavage of the methionyl peptide bonds of heat-sterilized proteins with cyanogen bromide to release protein fragments that can be extracted with 6 M urea solution.

A portion of canned fish was added to 100 ml. of a 70% formic acid solution containing 2.5 g. cyanogen bromide. The suspension was shaken for a few minutes and allowed to stand for 24 hr. The residue recovered from rotary evaporation was suspended in distilled water, dialyzed in running water for 24 hr., and evaporated to dryness. The residue was suspended in 10 M urea solution and allowed to stand overnight. The clear solution obtained after centrifugation was retained for electrophoresis. Samples of eight species of canned fish were subjected to the treatment.

Electropherograms of the eight species were distinguishable from one another and reproducible for each species. The patterns were characterized by many well-separated zones that have similar intensities of staining. The authors concluded

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7.9 (6.199)(6.134) N-NITROSODIMETHYLAMINE IN FISH MEAL

Sen, Nrisinha P., Leander A. Schwinghamer, Barbara A. Donaldson, and Walter F. Miles (Food Division, Health Protection Branch, Dept. of National Health and Welfare, Ottawa, K1A OL2, Canada)
Journal of Agricultural and Food Chemistry 20, No. 6, 1280-1281 (Nov.-Dec. 1972)

In 1971, R. J. Kirk (Experimental Fur Farm, Winnipeg, Canada) informed the present authors of the death of a large number of mink in Canadian farms. This information prompted the authors to examine mink feeds for nitrosoamines. These compounds are highly toxic to fur-bearing animals. Some of the feeds fed to the mink contained herring meal, but according to the manufacturers the meals had not been preserved with nitrate or nitrite. Some of the feeds were also examined for nitrate and nitrite. This article reports on the results of these analyses.

The results are presented in the table that follows. Six of the seven feeds and meals contained considerable amounts of N-nitrosodimethylamine (DMN). Small amounts of nitrate and no nitrite were detected in these samples. It is not clear how the DMN was formed in the absence of nitrite. One possibility is that small amounts of nitrite naturally present in the raw fish could have contributed to the formation of DMN, but such a small amount of nitrite would be completely destroyed by reaction with various amino compounds in the fish meal. The authors speculate that the hot fire gases from the combustion of fuel oils could be another source of nitrite. F. Ender and L. Ceh [Alkierende Verbindugen, Second Conference of Tobacco Research, Freiburg, Germany (1967), p. 83] stated that stack gases from fuel

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7.599 (8.59) DETERMINATION OF PHENOLIC WOOD SMOKE COMPONENTS AS TRIMETHYLSILYL ESTERS

Kornreich, Mary R., and Phillip Issenberg (Dept. of Nutrition and Food Science, Massachusetts Institute of Technology, Cambridge, MA 02139)
Journal of Agricultural and Food Chemistry 20, No. 6, 1109-1113 (Nov.-Dec. 1972)

Earlier work on wood smoke and smoked foods provided estimates of total phenolic compounds, but quantitative data were not available because of the lack of an appropriate analytical method. Gas chromatographic (GC) separation of free phenols is complicated because these compounds are polar in nature and have low volatility. The chromatographic peaks of phenols tend to be asymmetric; also, long times and high temperatures are required to elute some of the higher boiling phenols. However, peak symmetry in GC of phenolic compounds can be improved by forming derivatives of them having higher volatility and lower polarity. Silylating reagents, for example, react with hydroxyl, carboxylic acid, amine, and mercaptan groups by replacing the active hydrogens with trimethylsilyl (TMS) groups. By blocking the hydroxyl groups of the phenolic compounds, the formation of intermolecular hydrogen bonds is inhibited, and, as a result, the interaction of the derivatives with the solid support and apparatus surfaces are reduced, and peak symmetry is improved. In this work, the authors developed quantitative methods for the GC determination of trimethylsilyl derivatives of wood smoke phenols. The method was applied to wood smoke condensates and to model food components exposed to smoke vapor.

(over)

7.9 (6.199)(6.134)

oil contain up to 1,000 p.p.m. of nitrogen oxides and the industrial use of such gases for drying fish meal may lead to the formation of DMN.

Sample	N-Nitroso-dimethyl-amine (DMN)	Nitrate [1]	Nitrite
	p.p.m.	p.p.m.	p.p.m.
Mink feed	0.40	--	
	0.18	22	ND
Herring meal, whole	0.30	--	
	0.42	22	ND
	0.45	17	ND
Fish meal	ND [2]	13	ND
	0.12	--	

[1] Results expressed as sodium salt.
[2] ND = not detectable. Detection limit for MDN is 0.01 p.p.m. and for nitrite is 0.1 p.p.m.

[2 figures, 1 table, 25 references] FTP

7.599 (8.59)

The phenolic components were isolated by conventional methods based on acidity and the methods were described earlier [P. Issenberg, M. R. Kornreich, and O.A. Lustre, J. Food Sci. 36, 107 (1971)]. The phenolic fractions were treated with N,O-bis(trimethylsilyl)trifluoroacetamide at room temperature to form trimethylsilyl ethers. 3,5-Dimethylphenol was added as an internal standard to eliminate volumetric errors in gas chromatographic injection. Phenol, guaiacol, 4-methylguiaiacol, and syringol were the major components in the vapor phase of wood smoke. Quantitative data are given in the table that follows.

Compound	Whole wood smoke [1]	Wood smoke vapor phase [1]	Oil model [2]	Water model [2]
	µg./l.	µg./l.	µg./g.	µg./g.
Phenol	59.4	5.9	33.1	29.2
Guaiacol	417	32.1	176	77.7
4-Methylguaiacol	333	13.6	241	24.2
Syringol	392	6.5	102	68.5

[1] The whole smoke and the vapor phase were collected for 2 hr.
[2] The models, triolein solution and water were exposed to smoke vapor for 2 hr.

[2 figures, 2 tables, 17 references] FTP

7.599 (9.19) INTERFACING OF AN ATOMIC ABSORPTION SPECTROPHOTOMETER WITH A GAS-LIQUID CHROMATOGRAPH FOR THE DETERMINATION OF TRACE QUANTITIES OF ALKYL MERCURY COMPOUNDS in FISH TISSUE

Gonzales, J. G., and R. T. Ross (Environmental Protection Agency, Perrine Primate Laboratory, P.O. Box 490, Perrine, FL 33157)
Analytical Letters 5, No. 10, 683-694 (1972)

Because there are differences in the degree of toxicity between inorganic and organic forms of mercury, it is essential to determine not only the total mercury content but also the relative proportions of the different forms of the element present in the materials under examination. Methods are available for the determination of organic forms of mercury by gas-liquid chromatography using an electron capture detection system, but they involve a cleanup procedure for separation of the methyl mercury compound from other interferring substances. Recently, J. E. Longbottom [Anal. Chem. 44, 1111 (1972)] described a mercury specific gas chromatographic detector for the determination of dialkyl mercury compounds. In the present study, the authors modified this system to achieve maximum sensitivity. This report describes a method for the determination of alkyl mercury compounds based on gas-liquid chromatography separation, reduction of the organic mercury compounds by combustion, and measurement of the resulting atomic vapor by atomic absorption spectroscopy. The method was used for the determination of organic mercury compounds in fish tissue. The method possesses both sensitivity and specificity and does not require a cleanup step. It is adequate for monitoring levels of methyl mercury in fish tissue.
[5 figures, 2 tables, 16 references] FTP

7.9 (9.3)(3.3)

that a proportion of the fragments of protein released by reaction with cyanogen bromide are of a size that is suitable for separation by electrophoresis; furthermore, species specific patterns indicated genetically determined differences still exist at this level of protein structure.

The authors suggest that the method has potential value in the identification of canned or otherwise heat-treated fish products.
[1 figure, 12 references] SW

7.9 (9.19) GUPPY AS AN OBJECT USED TO DETERMINE THE ACTION OF TOXIC SUBSTANCES ON FISH

Chernyshova, V. M. (Inst. Gidrobiol., Kiev, U.S.S.R.)
Chemical Abstracts 77, No. 9, 57191g (Aug. 28, 1972)

8.8 PER CENT FATTY ACID COMPOSITION AND QUALITY DIFFERENCES OF CHINOOK AND COHO SALMON

Iverson, John L. (Division of Food Technology, Food and Drug Administration, U.S. Health, Education and Welfare, Washington, DC 20204)
Journal of the Association of Official Analytical Chemists 55, No. 6, 1187-1190 (Nov. 1972)

During the migration of chinook and coho salmon (from the Pacific Ocean) up the shallow fresh-water streams, the fish do not consume food but use their body reserves. These fish at the time of spawning are in fairly poor condition and quality. Recently artificial propagation practices have made available large quantities of salmon. The captured mature fish are stripped of their roe and the remaining fish are then made available to the market. These "spent" salmon can be canned or otherwise processed and sold without any special label requirements. The present study was undertaken to devise a chemical test, based on composition of the lipid constituents, to distinguish between regular salmon and the so-called spent salmon.

During their migration period the salmon utilize fat stored in their tissues for energy and for final development of the roe. Degenerative changes, therefore, take place in their visceral organs and the oil content of the tissues is reduced. It has been suggested that this catabolism results in changes in oil constituents; the long chain monounsaturated fatty acids 20:1 and 22:1 would be utilized before the shorter chain acids and the polyunsaturated acids. Furthermore, there should be a significant change in the relative amounts of the multibranched acids (which are normally present in relatively large amounts in marine oils).

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9.11 SOUND-SCATTERING LAYERS IN THE NORTHEASTERN PACIFIC

Donaldson, Henry A. (Graduate School of Oceanography, University of Rhode Island, Kingston, RI 02881), and William G. Pearcy (Dept. of Oceanography, Oregon State University, Corvallis, OR 97331)
Journal of the Fisheries Research Board of Canada 29, No. 10, 1419-1423 (Oct.1972)

Sound-scattering layers exist in midwater regions of most of the oceans of the world. Little information, however, is available on the seasonal and spatial variations of the sound-scattering layers in one region. Various types of organisms may cause scattering, and these include squids, euphausiids, fishes, and siphonophores. Also, scattering may be caused by more than one group of organisms. In this study, the migrations of the scattering layers and the changes in scattering from day to night, from season to season, and from inshore to offshore were examined off the Oregon coast over a period of several years. The relations between scattering and the biomass of various groups of animals were also determined on a scientific cruise between Hawaii and Adak, Alaska. The temporal and spatial variations in the depth, thickness, and vertical movements of the sound-scattering layers were obtained with the use of a 38.5 kHz echosounder.

Off the coast of Oregon, one or two layers migrated toward the surface of the sea at dusk and descended deeper in the water at dawn. The individual scattering layers migrated at a fairly constant rate during a twilight period, but the rates of ascent and descent varied from day to day. The average rates of migration were 2 to 3 m./min. At night, the depth of the top of the scattering layer averaged about 40 m.; during the day it varied between 50 to 245 m. The depth of the bottom of the deepest recorded scattering layer was 450 m.

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9.12 MIGRATION OF YEARLING SOCKEYE SALMON (ONCORHYNCHUS NERKA) AS DETERMINED BY TIME-LAPSE PHOTOGRAPHY OF SONAR OBSERVATIONS

Groot, C. (Fisheries Research Board of Canada, Pacific Biological Station, Nanaimo, British Columbia, Canada)
Journal of the Fisheries Research Board of Canada 29, No. 10, 1431-1444 (Oct.1972)

Sockeye salmon usually spawn in creeks or rivers adjacent to lakes. In this study, the authors examined the migration of sockeye salmon smolts from nursery areas (Babine Lake system) to their outlet by a combination of a high-frequency sonar and time-lapse photography. Frame-by-frame analyses of the films provided information on the speed, direction, and diurnal timing of the sockeye smolts during a 24-hr. period.

The migratory activity of the smolts in the lake centered around dusk and dawn; this pattern was similar to the one near the outlet where the smolts entered the river on their way to the sea.

The speed of movement of the smolts was from 19 to 51 cm./sec. (mean 30 cm./sec.), and the greatest speeds were at dusk and dawn.

The most direct movements of smolts were at twilight, when the migration activity was at its highest. The directional tendencies of movement were consistent with the shortest route to the outlet. In one area (at the junction between the main lake and two arms), the author noted that smolt movements were made that would lead the fish away from the outlet. He suggests that determination of direction must be largely innate because the smolts are migrating for the first time through areas to a goal where they have never been.

[8 figures, 2 tables, 10 references] FTP

9.125 USE OF OTOLITHS IN IDENTIFYING HERRING STOCKS IN THE SOUTHERN GULF OF ST. LAWRENCE AND ADJACENT WATERS

Messieh, Shoukry N. (Fisheries Research Board of Canada Biological Station, St. Andrews, New Brunswick, Canada)
Journal of the Fisheries Research Board of Canada 29, No. 8, 1113-1118 (Aug. 1972)

The use of otolith (small, calcareous discs of the inner ears of vertebrates) characters has proven useful in distinguishing herring stocks in the southern Gulf of St. Lawrence. Previously, otolith characteristics that varied with environmental changes were used for distinguishing fish stocks. A new method, using otolith characters that are little affected by the environment, has been developed that promises greater reliability.

Two otolith types are described: a sping-type (S) and an autumn-type (A). The S-type is characterized by having pararostrum and postrostrum (two protuberances at the rear end of the otolith--pararostrum dorsal and postrostum ventral) of approximately equal length and a well-developed excisura minor (a narrow groove separating pararostrum from postrostrum). The A-type is distinguished by a very poorly developed excisura minor and having the postrostrum longer than the pararostrum. Although minor differences occur within each type among different specimens, they exert no major effect on the distinguishing features mentioned above.

The validity of using otoliths to separate herring stocks was supported by comparison with relations of otolith length to fish length and with fin ray counts. Regression lines for otolith length on fish length were different between otolith types and localities, indicating the presence of more than one stock. Minor differences within each otolith type support this finding. Mean counts of pectoral

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9.16 (1.86) IMPROVEMENTS IN OR RELATING TO METHODS OF CULTURING SHRIMP ARTIFICIALLY

Spencer, G. E. (pat.)
British Patent 1,291,991
BFMIRA Abstracts 25, No. 12, Abstract No. 4502, 552 (Dec. 1972)

Diatoms are grown on the upper levels of saline water to a concentration which avoids direct sunlight reaching the bottom. The shrimp are hatched and cultured at least through the zoea stage in this water. The diatoms are circulated through the water and the larvae are fed first on the diatoms and later on invertebrates. An oxygen content of at least 2.5 cc/litre is maintained in the water. Reprinted

7.85 (8.8) BACTERIAL STUDIES ON THE THAWING OF FROZEN FOODS

Kozima, T. T., et al.
Refrigeration, Japan 46, No. 529, 13-18 (1971) (In Japanese)
BFMIRA Abstracts 25, No. 12, Abstract No. 4249, 494 (Dec. 1972)

The bacterial viability in commercially frozen foods after thawing is considered. The viable bacterial count of frozen sea foods was very high and it was shown that the count of some prepared frozen foods did not decrease when warmed for thawing, but cooking resulted in a decreased bacterial count. Some prepared frozen foods could have a lower bacterial count by prolonging the time of thawing before subsequent cooking. J.A.D. Reprinted

9.19 (0.35) MECHANISMS FOR SYNTHESIS OF ORGANIC MERCURY FOUND IN FISH

Anonymous
Nutr. Rev. 30, No. 1, 16-18 (1972)
BFMIRA Abstracts 25, No. 5, Abstract No. 1699, 345 (May 1972)

In this review article, two pathways for the synthesis of methyl mercury are described. In the first, non-enzymic methylation in the presence of methyl cobalamine and mercuric chloride occurs. The alternative route has been proposed for organisms with no requirement for vitamin B_{12} or its derivatives. This appears to be a detoxification reaction involving one or more steps in the methionine biosynthesis pathway and resulting in the methylation of mercury. L. P. Reprinted

9.15 OCCURRENCE AND TOXICITY OF A RED TIDE CAUSED BY NOCTILUCA SCINTILLANS, IN THE COASTAL WATERS OF HONG KONG

Morton, Brian, and P. R. Twentyman (Dep. Zool., Univ. Hong Kong, Hong Kong)
Chemical Abstracts 77, No. 9, 57371r (Aug. 28, 1972)

To examine the possible relation of sound-scattering to the biomass of various groups of organisms, animals were collected with a midwater trawl (having a 5-mm. square measure mesh liner). Specific layers were not sampled with the trawl; it was towed obliquely from 0-200 m. at night. Between Hawaii and Adak, the central waters area had large amounts of scattering but low midwater trawl catches; the transitional waters had high-intensity scattering layers and high biomass; and the subarctic waters had almost no scattering layers and high biomass. FTP
[3 figures, 1 table, 17 references]

9.11

The thickness of the scattering layers in the water column was greater during the night than it was during the day. The thickness of the scattering layer was greater over the continental slope area than at the abyssal depth area. In some years, the thickness was greater during the summer than it was during other seasons.

To examine the possible relation of sound-scattering to the biomass of various groups of organisms, animals were collected with a midwater trawl (having a 5-mm. square measure mesh liner). Specific layers were not sampled with the trawl; it was towed obliquely from 0-200 m. at night. Between Hawaii and Adak, the central waters area had large amounts of scattering but low midwater trawl catches; the transitional waters had high-intensity scattering layers and high biomass; and the subarctic waters had almost no scattering layers and high biomass. FTP
[3 figures, 1 table, 17 references]

8.8

The fatty acid profiles of regular (good quality) and spent (poor quality) chinook salmon and coho salmon were determined. The results indicated that the long chain monounsaturated fatty acids seemed to be preferentially utilized by the migrating salmon. Nevertheless, the author believes that there may be larger generic and specific run variations that preclude the use of a fatty acid compositional approach to differentiate between prime and spent salmon. FTP
[1 table, 5 references]

9.16 OYSTER SETTING METHOD AND APPARATUS

McMillin, David C. (Shelton, WA 98584); assignor to Olympia Oyster Company, Shelton, WA 98584) (pat.)
U.S. Patent 3,701,338 (Oct. 31, 1972)

This invention involves a method for obtaining a consistent set of oyster larvae on oyster shells and for obtaining the set on the convex side of the shells. FTP

9.125

and dorsal fin rays differed between spring-hatched and autumn-hatched herring. These results coincide with those obtained from spring- and autumn-spawning herring in the same region.

The main advantage of using otoliths is that fish can be separated individually, aiding study of interrelations between stocks and estimating mixing rates.
[7 figures, 4 tables, 11 references] Lee Thorson

9.16 (9.1) PRIMI RISULTATI POSITIVI DI FECONDAZIONE ARTIFICIALE NEL BRANZINO (DICENTRARCHUS LABRAX) SU VASTA SCALA [FIRST POSITIVE LARGE SCALE RESULTS ON THE ARTIFICIAL INSEMINATION OF SEA BASS (DICENTRARCHUS LABRAX)]

Arcarese, Gaetano, Gino Ravagnan (Capo Laboratories, Centro Ittiologico Valli Venete, 45010 Cà Venier, Rovigo, Italy), and Pietro Ghittino (University of Georgia, School of Veterinary Medicine, Dept. of Medical Microbiology, Athens, GA 30601)
Rivista Italiana Piscicoltura e Illiopatologia (The Italian Magazine of Fish Breeding and Fish Pathology) 7, No. 2, 27-33 (Apr.-May-June 1972) (Published by Italian Fish Culture Association, Via Indipendenza, 5-31100 Treviso, Italy) (In Italian; English and German Abstracts)

[In northeastern Italy the town of Cà Venier lies on a channel of the delta of the River Po on the coast of the Adriatic Sea. Aquaculture of sea bass in fenced lagoons in the estuaries of the Po is practiced in this region.]

Studies undertaken to intensify production of sea bass included attempts at artificial propagation.

A group of male and female sea bass were taken from a lagoon; those which were sexually mature were selected and placed in indoor tanks supplied with filtered, recirculated sea water at 36‰ salinity, and at 16° to 18° C.

After the fish had become acclimated, the females were injected with carp pituitary extracts consisting of prepared carp hypophysis.

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9.19 (0.5) FATE OF DDT IN SEVERN ESTUARY SEDIMENTS

Albone, Eric S., Geoffrey Eglinton, Nigel C. Evans, Judith M. Hunter, and Michael M. Rhead (Organic Geochemistry Unit, School of Chemistry, University of Bristol, Bristol, BS8 1TS, England)
Environmental Science & Technology 6, No. 10, 914-919 (Oct. 1972)

Although microbiological degradation processes may help reduce environmental pollution caused by use of persistent pesticides, detailed studies on the degradation pathways are necessary to assess the amount of hazard associated with degradation products.

Experiments were performed to study the ability of the sediments of a major British estuary to degrade p,p'-DDT; radiolabeled p,p'-DDT was used to follow the pathway of the degradation products. Incubations were performed with p,p'-DDT in sediments in situ and in the laboratory and in anaerobic sewage sludge.

For the in situ experiments a hole in the estuarine sediment was made by coring; a solution of ^{14}C-p,p'-DDT was dispersed in the bottom of the hole, and the core was replaced. After incubation for 46 days at temperatures varying between 5° and 25° C., the contents of the core were removed and extracted.

For comparative laboratory studies, samples of the darker, lower mud were collected with estuary water taken from nearby pools. A slurry of the mud and water was injected with ^{14}C-p,p'-DDT; the preparation was incubated anaerobically under hydrogen for 3 weeks at 25° C.

Incubation of ^{14}C-p,p'-DDT in anaerobic sewage sludge under hydrogen was performed at 35° C. No pesticide residues were found in extracts of control samples of sewage sludge or of estuarine mud from the sampling site.

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9.19 (9.3) PIEZOELECTRIC DETECTORS FOR ORGANOPHOSPHORUS COMPOUNDS AND PESTICIDE

Scheide, Eugene P., and George G. Guilbault (Dept. of Chemistry, Louisiana State University, Lakefront Campus, New Orleans, LA 70122)
Analytical Chemistry 44, No. 11, 1764-1768 (Sept. 1972)

There is a need for sensitive, selective monitoring devices to detect toxic substances in the environment. Other work had shown that the piezoelectric detector has these characteristics. It consists of a vibrating quartz crystal coated with a substrate that is capable of interacting selectively with a component of interest in a static system or flowing gas stream. The frequency of the crystal is dependent on the weight of the coating and the weight of a vapor adsorbed onto the coating. The concentration of a pollutant in the air can be measured by changes in the frequency of the crystal caused by adsorption by the coating of the pollutant.

The major part of the study was performed with a model compound (as the coating material) which is similar to regular organophosphorus pesticides in complexing ability but low in toxicity.

Studies conducted to determine the optimum conditions for the detector indicated that the greatest stability occurred when it was operated continually and with all the components properly shielded. Variations in room temperature did not materially affect the detector system.

The frequency of the crystal decreases as the coating mass increases until the crystal is overloaded and then it ceases to vibrate. This cutoff point is

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9.19 (8.42) MERCURY CONTENT OF SPINY DOGFISH (SQUALUS ACANTHIAS) IN THE STRAIT OF GEORGIA, BRITISH COLUMBIA

Forrester, C. R., K. S. Ketchen (Fisheries Research Board of Canada, Biological Station, Nanaimo, British Columbia, Canada), and C. C. Wong (Fish Inspection Laboratory, Fisheries Service, Vancouver, B.C., Canada)
Journal of the Fisheries Research Board of Canada 29, No. 10, 1487-1490 (Oct. 1972)

In January 1971, a commercial shipment of the flesh of the spiny dogfish (taken in the Strait of Georgia) was held up because the flesh contained more than 0.5 p.p.m. of mercury. A sampling program was then initiated of the dogfish from the area to determine whether or not there was a systematic pattern of mercury content in these fish.

The total mercury content of the dogfish from the Strait of Georgia reached a level of 0.5 p.p.m. at fish length of 72 cm. for male fish and at fish length of 77 cm. for female fish. For any fish length above 65 cm., the mercury content of the flesh was higher for the male fish than for the female fish; furthermore, the mercury content was higher for dogfish samples taken off the Fraser River Estuary than for samples taken in other areas of the strait. The mercury content of the dogfish reached 1.7 p.p.m. in male fish (to 95 cm. in total length) and almost 2.0 p.p.m. in female fish (to 120 cm. in total length).

The reasons for the difference in mercury content between the male fish and the female fish are not understood. Furthermore, the rate of mercury uptake in dogfish is not yet known.

[2 figures, 2 tables, 6 references] FTP

9.19 (9.3)

important in determining the optimum weight of substrate to be applied to the crystal. A slightly larger amount of substrate can be added before cutoff occurs if the crystal is coated on both sides. The cutoff frequency for 9 MHz crystals was found to be 242,065 c.p.s. at 605.16 µg. of substrate, single side; and 321,747 c.p.s. at 804.37 µg. of substrate coated on both sides. Coating substrate on both sides of the crystal substantially increased sensitivity. When a fresh coating of substrate was to be used it was found necessary to expose it to an organophosphorus compound repeatedly until chemisorption complexation at the surface of the substrate was complete. Subsequent to the formation of the chemisorption layer, the process is a completely reversible physisorption of the organophosphorus compounds to be tested.

Tests were performed on other common constituents and pollutants of the atmosphere as possible interferences with the detection system. The results indicate interference was nonexistent or minor.

The detector has potential use as an air pollution sensor and as a specific gas chromatography detector. A flow diagram and an electrical schematic of the detector are shown.

[6 figures, 2 tables, 25 references] SW

9.1 (9.16) STANDARDIZATION OF $Na_2{}^{14}CO_3$ SOLUTIONS FOR PRIMARY PRODUCTIVITY MEASUREMENTS IN WATERS

Findenegg, J. (Klagenfurt, Austria)
Chemical Abstracts 77, No. 8, 52187a (Aug. 21, 1972)

9.19 CELLULOSE SPONGE FOR REMOVING OIL SLICKS

Marx, John W. (Phillips Petroleum Co.)
U.S. Patent 3,677,982 (July 18, 1972)
Chemical Abstracts 77, No. 18, 116287t (Oct. 30, 1972)

9.19 MERCURY IN THE PULP AND PAPER MILL ENVIRONMENT -- APPRAISAL AND PERSPECTIVE

Marton, Joseph, and Terezia Marton (Westvaco Corp., Laurel Research Center, Laurel, MD 20810)

TAPPI (Journal of the Technical Association of the Pulp and Paper Industry) 51, No. 11, 1614-1618 (Nov. 1972)

Mercury discharges into the environment by five pulp and paper mills were examined. The U.S. pulp and paper industry no longer uses mercurials; however, some of its main raw materials contain mercury as a contaminant. Apparently, the most significant mercury discharge occurs through the burning of coal (1 to 2 lb. of Hg/1,000 ton of pulp). The industry's share of the coal burned is about 2% and the industry's share in airborne mercury pollution is about the same percentage. The pulp and paper industry discharges only about 0.1 lb. of Hg/1,000 ton of pulp into the waterways. The mercury content of some paper and board products runs about 0.1 p.p.m. In the United States about one-fourth of the paper production is incinerated. However, if all the paper products were burned only about 14 tons of Hg would be released into the atmosphere, a small fraction of the airborne mercury released by fossil fuel burning. Apparently, the paper industry does not contribute substantially to mercury pollution.

[7 tables, 15 references] FTP

9.16 (9.1)

The fertilized eggs were kept for 15 to 18 days at a temperature of 16° to 18° C. (which was found to be an optimum range). About 4 to 5 million larvae were hatched. This amount represents a hatch rate of about 80%.

After 60 days the sea bass fry appeared to be disease free. They were about 25 mm. in length. Methods to improve feeding of the young fry are being investigated. [14 photographs, 5 references] SW

9.19 (0.5)

After incubation, the samples were centrifuged. The supernatant was scintillation counted, and the residue was subjected to continuous Soxhlet acetone extractions at 56° C. for over 20 hr.

Gas-liquid chromatography analysis and radioscanning of the total extract from the in situ incubations indicated only a slight degradation of p,p′-DDT to p,p′-DDD. In contrast, laboratory incubations of p,p′-DDT in estuarine sediments produced greater conversion to p,p′-DDD. Incubation of p,p′-DDT with anaerobic sewage sludge caused the most extensive breakdown to p,p′-DDD. The numbers of aerobic bacteria in the sediment were approximately 10^6 to 10^7 organisms/gram of wet mud; anaerobic bacteria counts were usually around 10^5 to 10^6 organisms/gram. Compared with controls, DDT (mixed isomers) at 100 p.p.m. in nutrient agar consistently reduced the aerobic and anaerobic bacterial counts. Tests indicated that bacteria isolated from estuarine mud and inoculated into nutrient broth containing 10 p.p.m. of DDT were able to degrade the DDT. The cultures were incubated in the dark at 20° C. under regular aerobic conditions and no attempt was made to prevent the development of anaerobic conditions locally as a result of rapid bacterial growth in the broth culture.

[1 figure, 5 tables, 33 references] Mary Ellen Engett

9.19 MERCURY LEVELS IN MUSCLE TISSUES OF PRESERVED MUSEUM FISH

Evans, Ronald J., Jack D. Bails (Fish Division, Michigan Dept. of Natural Resources, Lansing, MI 48926), and Frank M. D'Itri (Institute of Water Research and Dept. of Fisheries and Wildlife, Michigan State University, East Lansing, MI 48823)
Environmental Science & Technology 6, No. 10, 901-905 (Oct. 1972)

Mercury contamination has recently been discovered in fish populations of the Lake St. Clair-Western Lake Erie area of the Great Lakes. This study was undertaken to determine the prior duration and the extent of contamination.

Preserved museum fish taken from the Lake St. Clair-Western Lake Erie region between the years 1920 and 1965 were compared to fresh fish obtained from the same area in 1970-71 for mercury levels. After determination of mercury levels, the fish were placed into one of four categories according to 1970 mean mercury levels in parts per million: I, > 3.0; II, 2.0-3.0; III, 0.5-2.0; and IV, < 0.5. These values were then plotted against years for both Lake St. Clair fish and Lake Erie fish. Category I had only one fish from Lake Erie, but contained several fish from Lake St. Clair. All Category I fish had high mean levels of mercury prior to 1945 and showed a slight increase between then and 1970. Therefore only Categories II, III, and IV will be considered, as a group.

Prior to 1945 in Lake St. Clair, all categories (II, III, IV) showed low mean levels of mercury. In 1965, these categories showed elevated mercury levels and by 1970, all showed greatly elevated levels.

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9.19 ABANDONED LARVACEAN HOUSES: A UNIQUE FOOD SOURCE IN THE PELAGIC ENVIRONMENT

Alldredge, Alice L. (Graduate Group in Ecology, University of California, Davis, CA 95616)
Science 177, No. 4052, 885-887 (Sept. 8, 1972)

Larvaceans are pelagic tunicates of the class Appendicularia, and they are one of the most common members of marine zooplankton. The larvaceans filter out nannoplankton through a unique feeding structure named the "house." This house is secreted around the animal by the oikoplast epithelium of the animal body. When the filters of the house clog with algae and particles of detritus, the animal abandons the house and builds a new one. Some larvaceans build a new house every 4 hr.; others, every 2 hr. Apparently, the ecological significance of these abandoned larvacean houses has not been considered previously. This article reports on the observations, field and laboratory, of copepods feeding on the clogged filters of abandoned larvacean houses in the open ocean.

Field tests were made in the Florida Current 6 to 10 km. west of Bimini, Bahamas, in 10 to 15 m. of water by use of conventional scuba techniques. The houses of Oikopleura longicauda, O. fusiformis, and Megalocercus abyssorum were found to be the most abundant. Up to 33% of the abandoned larvacean houses had various copepods resting on the incurrent filters or associated with the inner apparatus. Laboratory tests showed that the copepod Oncaea mediterranea actually feeds on the larvacean houses. In the course of the study, techniques for the photographing of the larvacean houses in the field were developed. The one photograph in the article shows the head-on view of M. abyssorum in its house.

(over)

9.19 DISAGREEMENTS ON WHY BROWN PELICAN EGGS ARE THIN

Hazeltine, William (26 Rosita Way, Oroville, CA 95965)
Nature 239, No. 5372, 410-411 (Oct. 13, 1972)

The author disagrees on four points with the proposal by Blus, et al. [L. J. Blus, C. D. Gish, A. A. Belisle, and R. M. Prouty, Nature 235, 376 (1972) and L. J. Blus, R. G. Heath, C. D. Gish, A. A. Belisle, and R. M. Prouty, Bio-Science 21, No. 24, 1213 (1971)] that DDE is the probable cause of thin eggshells in brown pelicans. Data are presented that appear to completely refute the contention that DDE causes thinning of brown pelican eggshells. Pertinent data extracted from table 1 of the article are as follows:

(over)

9.19 ACUTE ZINC TOXICITY TO RAINBOW TROUT (SALMO GAIRDNERI): CONFIRMATION OF THE HYPOTHESIS THAT DEATH IS RELATED TO TISSUE HYPOXIA

Burton, Dennis T., Alma H. Jones, and John Cairns, Jr. (Dept. of Biology and Center for Environmental Studies, Virginia Polytechnic Institute and State University, Blacksburg, VA 24061)
Journal of the Fisheries Research Board of Canada 29, No. 10, 1463-1466 (Oct. 1972)

The toxicity of heavy metals to fish has been attributed to the coagulation or precipitation of mucus on the gills and to cytological damage to the gills; there appears to be a breakdown in gas exchange at the gills. However, J. F. Skidmore [Quart. Rev. Biol. 39, 227-247 (1964)] suggested that death in fish with gills damaged by heavy metals is probably caused by tissue hypoxia. The purpose of the present study was to test this hypothesis. Rainbow trout were exposed to lethal levels of zinc sulfate in water nearly saturated with oxygen, and changes in the lactic acid and pyruvic acid concentrations in the skeletal muscle and liver tissue were measured.

When rainbow trout are exposed to acute toxicity levels of zinc, tissue hypoxia appears to be a major physiological change preceding death. Apparently, gill damage modifies gas exchange and creates hypoxia at the tissue level--supporting Skidmore's earlier hypothesis. Other heavy metals similar to zinc appear to kill certain species of fish when the fish are exposed to acute toxicity levels of the metals; therefore, the authors believe that death related to tissue hypoxia may also be occurring in these species.

[2 tables, 17 references] FTP

9.19

Brown pelican (Anacapa Island, Calif.) egg data

Date collected	Weight of yolk	Lipid content of yolk	Thickness of shell	Incubated	Residue of p,p'DDE in whole yolk	Calculated content of p,p'DDE on lipid basis
	g.	%	mm.		p.p.m.	p.p.m.
18/4/69	15.1	21.8	0.42	no	357.5	1,640
	38.7	6.3	0.38	yes	61.1	970
	15.3	23.7	0.37	no	204.4	860
	17.5	22.9	0.37	no	232.1	1,010
27/5/69	13.6	26.2	0.36	no	178.4	680
	16.8	26.9	0.34	no	183.0	680
	47.9	4.4	0.40	yes	55.8	1,270
	25.3	12.2	0.40	yes	143.4	1,172
	49.7	2.8	0.38	yes	29.4	1,045

Although the popular press and scientific literature have established that DDE is the cause of thin eggshells of brown pelican or peregrine, the author believes that the underlying data to test the conclusion are just now becoming available and do not support such a conclusion.
[3 tables, 8 references] FTP

9.19

Lake Erie fish, prior to 1937, showed low mercury levels which increased slightly during the 1942-1964 period. By 1970-71, the mercury levels had increased substantially.

The current Food and Drug Administration action level is 0.5 parts per million mercury in fish. All categories (except I) were below this level up to 1965 in Lakes Erie and St. Clair. Between 1965 and 1971, all categories exceeded that level except Category IV fish from Lake Erie.
[3 figures, 1 table, 13 references] Lee Thorson

9.19 PROBLEMS IN THE DETERMINATION OF POLYCHLORINATED BIPHENYLS

Zitko, V. (Biol. Stn., Fish. Res. Board Canada, St. Andrews, New Brunswick, Canada
Chemical Abstracts 77, No. 9, 57227y (Aug. 28, 1972)

9.19 (9.2) MULTI-DISCIPLINARY STUDY OF WATER QUALITY RELATIONSHIPS: A CASE STUDY OF YAQUINA BAY, OREGON

Castle, Emery N., Stoevener, Herbert H., Joe B. Stevens, and Howard F. Horton (Oregon State University, Corvallis, OR 97331), Adam Sokoloski (Environmental Protection Agency, Washington, D.C.), and Loys Parrish (Environmental Protection Agency, Cincinnati, Ohio)
Special Report 348, Agricultural Experiment Station, Oregon State University, Corvallis, OR 97331 (Feb. 1972), 135 pp.

This report deals basically with the problem of how a community or a geographic area manages the economic activity which affects its environmental quality. Various specific issues included: (1) the economic value of outdoor recreational activity to a community, (2) the direct and indirect economic effects on a community of alternative levels of water quality resulting from industrialization, (3) the institutional means by which a community may manage the natural resources at its disposal, and (4) the management alternatives open to a community resulting from unique local conditions.

Chapter I is the Introduction. Chapter II discusses how the demand for and value of the recreational fishery in Yaquina Bay were estimated. Chapter III discusses the economic impact of the current level of recreational activity upon the study area. Chapter IV contains an analysis of relevant alternative waste disposal methods in Yaquina Bay. Chapter V is an assessment of the biological consequences of these alternative waste disposal schemes, and Chapter VI contains an economic evaluation of the alternatives. Chapters VII and VIII deal with water quality management institutions and some broad interpretations of the results of this study in relation to public policy in water quality management.
[63 references] FTP

9.19

The results of the study have four implications. (1) The following avenues of the pelagic food web are revealed:

Nannoplankton → (Larvacean houses) → Copepods and other crustaceans → Carnivores

Furthermore, this food chain may be significant. (2) Abandoned larvacean houses, mucus feeding webs of pelagic gastropods, and organic aggregates provide numerous microsurfaces that are benthic in nature and suitable for benthic feeding methods. (3) Because of the abundance of abandoned larvacean houses in the sea, they may be a major source of particulate organic matter. (4) Because larvacean houses are destroyed or filtered through most conventional planktonic nets, they must be observed directly if their biology is to be understood.
[1 photograph, 1 table, 9 references] FTP

9.19 PROTECTING FISHERY RESERVOIRS FROM POLLUTION BY INDUSTRIAL WASTE WATERS

Gusev, A. G. (U.S.S.R.)
Chemical Abstracts 77, No. 10, 65984h (Sept. 4, 1972)

9.2 INDUSTRIAL APPLICATIONS OF TECHNOLOGICAL FORECASTING: ITS UTILIZATION IN R & D MANAGEMENT

Cetron, Marvin J., and Christine A. Ralph
Published by Wiley-Interscience, New York, N.Y. (1971), 563 pp.
Joseph P. Martino (reviewer)
Technological Forecasting and Social Change 4, No. 1, 112-115 (1972)

This book is directed toward industrial applications of technological forecasting. It is divided into two sections. The first consists of the results of a questionnaire survey of industrial use of technological forecasting and a set of case studies based on interviews with industrial respondants. The second consists of a series of contributed essays on various aspects of technological forecasting. This book is not a comprehensive coverage of technological forecasting methods nor of information on how to carry out the implementation of such methods in industry. It is lacking, too, in treatment of non-R&D applications of technological forecasting in industry, such as analysis of mergers and acquisitions, new venture analysis, forecasting changes in methods or processes, forecasting changes in management techniques, and the identification of new markets. There is still a need for a book that treats, comprehensively, the use of technological forecasting in industrial applications.
[3 references] FTP

9.3 LONDON CONFERENCE AGREES ON OCEAN DUMPING CONVENTION
(9.19)

Train, Russell E. (Council on Environmental Quality)
Department of State Bulletin 67, No. 1747, 710-717 (Dec. 18, 1972)

An intergovernmental conference which met at London October 30-November 13 agreed on the text of a Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter. [This article contains a statement by Russell E. Train, Chairman of the Council on Environmental Quality and head of the U.S. delegation to the conference, issued at London on November 13 and the text of the convention, with annexes.]

Such an agreement [Convention on Ocean Dumping] has been a major policy objective of the United States. The new agreement is a strong and effective measure which represents a historic step toward the control of global pollution.

The framework of the convention is quite simple. It recognizes that the health of the marine environment is of vital importance to mankind. It requires governments to regulate dumping, including monitoring. Certain very harmful substances, such as certain pesticides, persistent oils, high-level radioactive wastes, persistent plastics, cadmium, mercury, and their compounds, et cetera, are prohibited to be dumped entirely. Another group of wastes are to be dumped only under special conditions, requiring special permits. These include cyanide and fluoride wastes and other materials containing certain heavy metals such as arsenic, lead, and chromium. Finally, all other substances will require general permits. Thus, all matters dumped into the oceans will be brought under regulation.

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9.2 EMERGING PATTERNS IN NEW VENTURE MANAGEMENT

Jones, Kenneth A. (Technostructure Corp., Syracuse, N.Y.), and David L. Wilemon (School of Management, Syracuse University , Syracuse, N.Y.)
Research Management 15, No. 6, 14-27 (Nov. 1972) (Industrial Research Institute, 100 Park Ave., New York, NY 10017)

In this article, the nature, characteristics, and activities of venture management groups are reviewed. Venture management groups have been proposed as one approach to make companies more responsive to challenges of their operating environments. The idea behind venture management is to provide groups of people freedom and flexibility in the development and the design of new businesses. The specific objective of this study was to provide an insight into the venture management concept by reporting the results of a study that covered the following related areas: (1) the nature of venture management teams, (2) the characteristics of venture managers, (3) the organizational importance assigned to venture management, (4) management of the venture team, (5) intraorganizational contributions of other company operating units, and (6) organizational acceptance and opposition to the venture management concept. The study involved 24 large consumer and industrial goods companies. The principal method for gathering the data was by use of a detailed 10-page questionnaire. This report should help one to evaluate the feasibility and benefits of the venture management approach to new product research and development.
[6 tables, 5 references] FTP

9.3 THE LEGAL STATUS OF THE CONTINENTAL SHELF OF THE EAST CHINA SEA

Allen, Donald R. (District of the Columbia Bar), and Patrick H. Mitchell (California and District of Columbia Bars)
Oregon Law Review 51, No. 4, Part II, 789-812 (Summer 1972)

Recent reports that the continental shelf of the East China Sea may contain large oil deposits accounts for the present interest of countries bordering on that sea to the extent of their sovereignty over that shelf. Apparently, international law does not provide an easy solution to delimitation of the boundary on the continental shelf of the East China Sea; in fact, it can be used to support competing positions. In this article, the authors identify the continental shelf boundary problems of each of the interested states, examine the legal basis for their claims, and analyze the competing claims to determine a reasonable range of solutions under international law.

Having outlined the legal considerations from which a delimitation of continental shelf boundaries might be made in the East China Sea, the authors discussed three distinct alternative methods of delimitations that could be considered as a basis for furthering agreement among the parties. These are: (1) Equity. The equitable delimitation is based on special circumstances and involves certain factors in reaching a decision such as general configuration of the coasts of the parties; the physical and geological structure, and natural resources of the area; and the element of a reasonable degree of proportionality. Although the

(over)

9.3 THE 1971 UNITED STATES PROPOSALS ON THE BREADTH OF THE TERRITORIAL SEA AND PASSAGE THROUGH INTERNATIONAL STRAITS

Knight, H. Gary (Marine Resources Law, Louisiana State University)
Oregon Law Review 51, No. 4, Part II, 759-787 (Summer 1972) (School of Law, University of Oregon, Eugene, OR 97403)

On August 13, 1970, the United States Government presented a working paper at the meeting of the United Nations Committee on the Peaceful Uses of the Sea-Bed and the Ocean Floor Beyond the Limits of National Jurisdiction (Seabed Committee). This working paper concerned a regime to govern exploration for and exploitation of the nonliving resources of the seabed beyond limits of national jurisdiction. It was part of a larger package of law-of-the-sea proposals that the United States ultimately would place before the international community in connection with the forthcoming Third United Nations Conference on the Law of the Sea. Additional proposals submitted in 1971 consisted of three articles: Article I establishes a maximum limitation of 12 nautical miles on the breadth of the territorial sea; Article II provides for free transit through and over international straits; and Article III provides the basis for a high seas fishery management program, including a system of preferential fishing rights for coastal states. In the present paper, the author identifies and describes Articles I and II of the new proposals and makes some preliminary comments on their elements.

In his conclusion, the author states that important issues are at stake in the current law-of-the-sea negotiations, and that it is crucial that an essentially international regime governing activities in ocean space be evolved so that the weaknesses of the nation-state system do not spread into the ocean arena. Emphasis should be on cooperation, and the regimes should be developed on the basis of their own substance, without compromise because of real or imagined defense needs. [102 footnotes] FTP

9.3 (9.19)

Standing alone, this convention will not solve the problems of marine pollution. But when the dumping convention is considered with other conventions adopted through the Intergovernmental Maritime Consultative Organization (IMCO), especially those dealing with oil pollution, a genuinely workable framework of controlling marine pollution is emerging.

...we are building a momentum on international steps to control pollution. The nations of the world must maintain it. International cooperation to protect the environment provides a positive and vital opportunity for the nations of the world to work together. The United States will continue to lend its full support to these efforts. Reprinted in part

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9.6 FISHERY PUBLICATIONS, CALENDAR YEAR 1971: LISTS AND INDEXES

Manar, Thomas A. (Scientific Publications Staff, National Marine Fisheries Service, NOAA, Seattle, WA 98115)
NOAA Technical Report NMFS CIRC-372, iv + 24 pp. (Oct. 1972) For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Price 30 cents.

Fishery Publications of the National Marine Fisheries Service, National Oceanic and Atmospheric Administration, in calendar year 1971 are listed numerically (with abstracts) and indexed by author, subject, and geographic area. The following series are included: NOAA Technical Report CIRC (formerly Circular); Data Report; Fishery Leaflet; and NOAA Technical Report NMFS SSRF (formerly Special Scientific Report--Fisheries). FTP

9.2 PROSPECTS OF PETROPROTEIN
(0.8)(0.6)

Masuda, Yoshiro (Biological Chemistry Section, Central Research Laboratory, Mitsubishi Petrochemical Co., Ltd.)
Chemical Economy & Engineering Review 4, No. 10, 22-28, 36 (Oct. 1972) (Chemical Economy Research Institute, Shikoku Bank Bldg., 13-7, 1-chome, Uchi-Kanda, Chiyoda-ku, Tokyo, 101 Japan)

This article is a brief review of the methods of production, the composition, the uses, and the problems associated with the production of petroprotein. Data are given on the proximate composition, and amino acid and vitamin content of three Japanese-produced petroproteins. Data on proximate composition are presented in the table that follows.

Item	Composition of the petroproteins in wt %		
	Product 1	Product 2	Product 3
Moisture	5.8	4.4	5.2
Crude protein	61.8	56.5	53.1
Crude protein (dry basis)	65.6	59.1	56.1
Crude fat	4.9	1.4	7.8
Crude fiber	5.7	4.2	6.5
Crude ash	5.6	7.7	5.7
Nitrogen-free extract	16.2	25.8	21.7

[6 figures, 3 tables, 6 references] FTP

9.3

principle of equitable delimitation of overlapping continental shelf boundary areas is the oldest and probably most widely used method, it is the most imprecise. However, delimitation by equitable principles may best accommodate some of the unusual geographic features of the East China Sea area. (2) Equidistance. The equidistant principle involves the establishment of fixed base points from which an equidistant boundary line is then constructed. (3) Other Mathematical Formulas. These include formulas weighted for length of coastline, total size of national territory, size of population, or even height of mountains. Although international law offers no absolute solutions to problems of determining boundaries of the continental shelf, it does present possible approaches that could be used to reach an agreement. [85 footnotes] FTP

9.7 HOW TO PREDICT CREATIVITY FROM BIOGRAPHICAL DATA

Whiting, Bruce G. (Dept. of the Army)
Research Management 15, No. 6, 28-34 (Nov. 1972)

The author believes that the link between biographical data and scientific creativity has been firmly established and that use of the method he describes here will raise the probability of hiring creative R&D workers.
[1 figure, 2 tables, 8 references] FTP

2.3 SEAFOOD SORTER

Harper, Foye H. (P.O. Box 352, Newberg, OR 97132) (pat.)
U.S. Patent 3,696,925 (Oct. 10, 1972)

This sorter separates wet, sticky chunks of seafood from a pile of such chunks. FTP

9.6 CHITIN AND CHITIN DERIVATIVES.
AN ANNOTATED BIBLIOGRAPHY OF SELECTED PUBLICATIONS
FROM 1965 THROUGH 1971

Pariser, E. R., and S. Bock (compilers)
Report No. MITSG 73-2, 199 pp. (Oct. 15, 1972) (Sea Grant Project Office, Massachusetts Institute of Technology, Cambridge, MA 02139)

In a report from other work an estimate is given that chitin is the second most important natural polysaccharide on earth and is more abundant than cellulose. Insects, crustacea, copepods, and many other invertebrates synthesize, or use chitin synthesized by other forms, for structural support and protection from the environment. As a result of serious pollution problems caused by annual dumping of thousands of tons of waste from lobster, shrimp, and crab packing plants which is highly resistant to biodegradation, a systematic, in depth study of chitin was required. The existing body of knowledge on the distribution, properties, and uses of chitin was widely scattered. This information was concentrated into a bibliography which has a few references that are dated 1962, 1963, and 1964. Most of the cited literature was published in the years 1965 through 1971.

The subject matter is divided into eight sections: distribution and localization of chitin and its derivatives in extant plants and animals, and in fossils; properties of chitin and its derivatives; interactions of chitin and related compounds with other molecules; chitin metabolism; chitinases and related enzymes; chitin and its derivatives as industrial raw materials; preparation and purification of chitin and its derivatives; and foreign and United States patents.

Each article is abstracted. There is a subject and an author index. SW

6.6 (0.4) POTENTIAL BIOMEDICAL SUBSTANCES IN THE EXTRACTS OF MARINE ORGANISMS

Yasumoto, Takeshi (Fac. Agric., Tohoku Univ., Sendai, Japan)
Chemical Abstracts 76. No. 17, 95551m (Apr. 24, 1972)

9.7 (1.0115) NEW ENGLAND & THE SEA.
A GUIDE FOR STUDENTS AND TEACHERS

Shafer, Thayer (editor) (Marine Advisory Service, University of Rhode Island, Narragansett Bay Campus, Narragansett, RI 02882)
University of Rhode Island Marine Bulletin, No. 11, 58 pp. (1972). Price $1.00. Available from the Marine Advisory Service, University of Rhode Island, Narragansett Bay Campus, Naragansett, RI 02882)

This guide [work book] is intended to accompany the showing of the television, series "New England and the Sea" produced in 1972 for 4-H audiences in Rhode Island and Massachusetts. Although the setting for the series was New England, the author indicates that the material can be used in any study of marine topics. Some of the topics discussed include oceanography; evolution of the New England coast; tide pools and the rocky intertidal zone; beach, dune, and marsh; sounds of the sea; marine food chain; commercial fishing; boats; navigation; pollution, coastal zone uses; and marine careers. Each section contains references to pertinent books and films. FTP

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